Products finishing

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Volume 1 SEPTEMBER, 1937 Number 12

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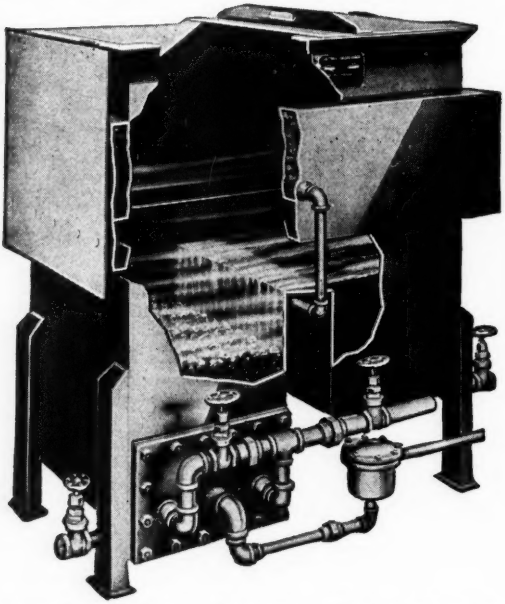

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Products Finishing

CINCINNATI, OHIO VOL. 1, No. 12

SEPTEMBER, 1937

Modern Materials Applied to Modern Finishing Problems

BY S. P. WILSON, PH.D.
The Varnish Products Co., Cleveland, Ohio

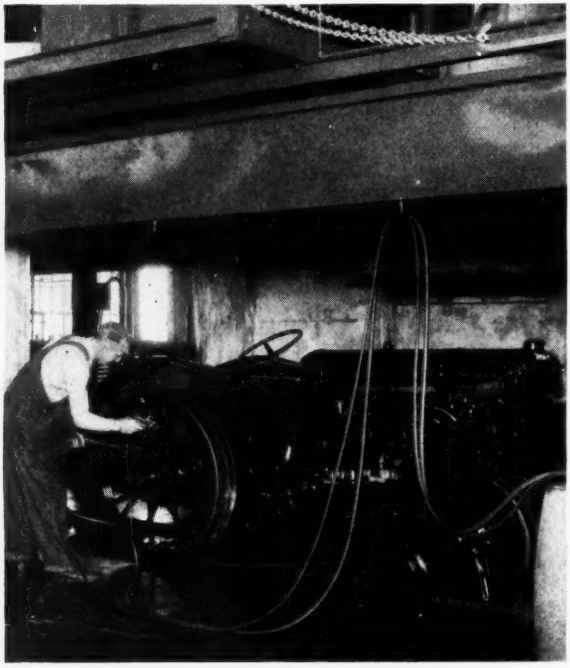
IN a previous article in this publication, wherein the writer discussed some of the newer film-forming materials of both the cellulosic and resin types, he said that in a future article some of the applications of these materials to finishing problems encountered in actual practice would be given. In this brief list of case histories of finishing material problems, it is not practicable for obvious reasons to give compositions of the materials used as a solution, but all were solved by the use of one or more of the newer raw materials mentioned in the first article. Some of the most interesting applications, those to wood, fabric and rubber, are outside the scope of this magazine but a few interesting examples in the metal field have been taken and the writer hopes that other workers in these fields will supplement this discussion by giving other cases so as to afford the reader as comprehensive an idea as possible of the enlarged scope made available by these newer chemical discoveries.

Such well known and previously described applications as the high-bake white alkyd finish for refrigerators, the low bake alkyd and modified alkyd enamels for certain makes of automobiles and the use of vinyl compounds for beer-cans need only be mentioned. The following cases are not necessarily large or important to consumers but the writer found the problems of interest and other similar problems may come to the readers' minds where similar formulae might serve.

CASE 1

A large maker of hoes for agricultural work, who for a long time had painted the hoe in colors, decided to show the trade the excellent quality of the forged steel, one-piece implement he made as compared to a lower-grade, welded and thoroughly painted hoe imported from abroad. To do this he decided to use a clear finish

(*Illustrations courtesy The DeVilbiss Company*)



Farm tractors in storage and in use require finishes that have maximum resistance to deterioration.

instead of the colored one, so that the construction of the hoe was visible at all points.

The requirements for this finish were 1. maximum resistance to rust in transit and storage. 2. clarity and water-whiteness 3. quick initial set-up to avoid picking up dust. 4. Final baking to a hard surface that did not print when wrapped, piled and shipped.

Lacquers, oil varnishes and synthetics were tried. The lacquers had all the requirements but the first—the film obtained at permissible cost not being thick enough to resist the rusting in some sections of the country. Oil varnishes had a tendency to too much color, especially after baking, and the set-up was too slow. Most of the usual alkyds were slightly deficient in moisture resistance and print-proofness at the available baking schedule.

The final choice was a blend of radically different synthetic resins, one in fact commonly thought incompatible. Results have been most satisfactory.

CASE 2

A manufacturer of lighting equipment desired a finish for the interior of lamp reflectors. The requirements were whiteness, gloss and most particularly retention of color and life under the very severe conditions of light and heat intensity caused by high-wattage bulbs in close proximity to the finish. In addition, the problem was complicated by the fact that the manufacturer was unable to bake the finish and required an air dry of almost lacquer speed.

The problem was solved by using one of the newest film-forming resins in solvents, so formulated that the film dried within 30-40 minutes to permit of the necessary handling. While the resin was not converted at this point, the location of the finish on the inside of the reflector did not demand adhesion. In actual use however, the necessary baking for durability was received from the heat of the bulb, so in this case a satisfactory air dry finish evolved from what is usually a distinctly baking-type.

CASE 3

A manufacturer employed thin chromium plated aluminum sheets

which were etched and decorated with lacquer in a desired design. It was then required to form the sheet into definite shapes and in the operation the chromium plate was badly scratched. A thin coat of lacquer was tried and found to protect the chromium, but the scratches showed on the lacquer. Washing off with thinner was impractical, as the lacquer decorations were affected by the thinner. By using another of the new materials it was found easily practicable to coat with this, form the sheet, and then remove the scratched coating with a solvent that did not attack the lacquer. Rejects due to scratched chromium have disappeared and a rapid and steady production is maintained. Here we have the unusual condition of a finish applied and then removed in a few minutes, instead of being chosen for long adhesion and durability.

CASE 4

This also was involved with forming and stamping operations but with entirely different requirements. Here it was desired to decorate fairly heavy sheet metal with a finish that would withstand very severe blanking, stamping and forming operations. A long time was spent on this formula and with the aid of some of the more recent materials it is possible to do the following:

Apply 1 coat of forming ground coat, air dry 25 minutes.

Grain or otherwise decorate by roll, plate and roll, lithographic press or other method.

Bake at 300 deg. for 1 hour.

Apply clear top-coat.

Bake 250 deg. for 1 hour.

Polish.

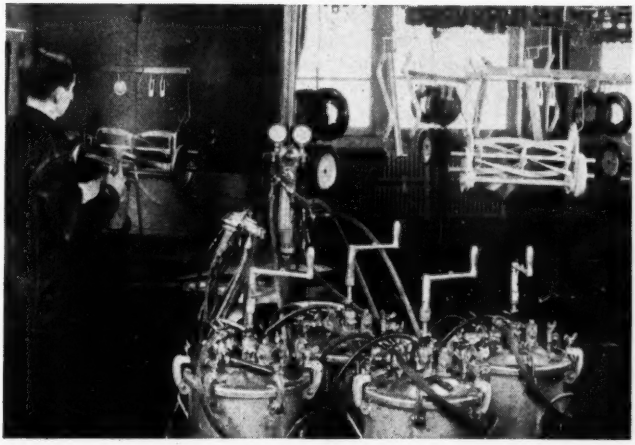
Coat with drawing compound and put through full blanking, slotting and forming operations.

Complicated and delicate designs have been put through on this schedule and the sheet subjected to severe forming thereafter without marring the finish in the least.

CASE 5

A manufacturer of household appliances encountered trouble with a white synthetic one coat finish. Altho this had beautiful gloss and flow, adhered well and covered well there were periodic reports of rusting in service and even in storage. Use of a white primer was tried and altho some betterment was observed, rusting still occurred.

A special clear primer, made in rather unusual fashion, and lightly pigmented with aluminum lining powder was developed and exhaustively tested. Results have apparently been decidedly successful and the system has been adopted.



An attractive, long-lasting finish is being applied to lawnmower blades by the spray operator shown in this illustration.

CASE 6

A maker of fire extinguishers using brass and copper shells loaded with carbon tetrachloride needed a finish that would dry with extreme rapidity —in about 10 minutes—to a point where the solvent that might splash on during filling would not mar the appearance of the finish. The usual metal lacquer requirements of clarity, light color, adhesion and abrasion resistance were also present. Here a combination lacquer using some of the newer ingredients together with older ones gave the desired result.

The above few instances can no doubt be equalled in many finishing products manufacturers' laboratories. The one point the writer wishes to make is that exceptional and almost, in some cases, ridiculous combinations of requirements are in many cases susceptible to successful formulation and that in many of these instances the success is due to the cellulosic and resin film-forming materials of comparatively recent development.

If a product designer or engineer or finishing foreman can make clear to his supply house exactly what combination of qualities he would like for a specific problem it is quite possible today that he can get them. Of course, in many cases the product as finally made is not cheap but if lower priced standard goods do not serve the purpose, and a tailor-made formula does, a fair price, even if a high one, is all that can be expected.

Broadside N-22 is now being distributed by Leeds & Northrup Company, 4934 Stenton Ave., Philadelphia, Pa. Of interest to executives, engineers and operating men is the concise discussion of methods and instrument types through which are realized the full possibilities of modern temperature measurements and control.

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The remarkably complete line of Micromax and other L&N pyrometer instruments is illustrated and briefly described. To meet the needs of each plant problem, from the simplest to the most elaborate, it offers a wide choice of models from among which suitable ones can be chosen to indicate, to record, to signal, to control, or to perform these functions in any combination. Copies free upon request.

Buffing Lacquer No. 950 and Blue Knight BA-Flex. Product summaries of these two products have been made available by Roxalin Flexible Lacquer Co., Inc., Box 775, Elizabeth, N. J. No. 950 is a clear, cellulose type, air drying flexible lacquer. It is a permanent, water-white material which resists discoloration by sunlight and does not change or deepen the color of the underlying metal. It is said to buff to a deep, high lustre and does not chip, flake, or peel.

BA-Flex is a cellulose type, air drying and baking flexible enamel. It is said to withstand chromium plating, and requires only one bake even when several coats are applied.

"TAG Indicating and Recording Temperature and Pressure Instruments No. 1060C." This is the title of a 56-page book which is now being issued by the C. J. Tagliabue Mfg. Co., Park & Nostrand Aves., Brooklyn, N. Y. It is said to be more than a regular listing catalog for it presents information in a clear, understandable manner on the latest TAG developments. Complete data will be found on indicating and recording controllers for temperature and pressure, recording thermometers, recording pressure gages, and dial indicating thermometers. The many illustrations not only show how these pressure spring instruments operate, but also the practical installation photographs tell an interesting story of how TAG instruments are serving the process industries. Copy of Catalog No. 1060C free upon request.

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Dykast Enamels can be applied directly to the bare surface of clean die castings without pretreatment, but pretreatment is desirable if the castings are coated with oxide.—Adv.

Charts for Metal Finishes

The basic principles involved in the construction of finish test charts are described herewith.

By Albert F. Byers

Benjamin Franklin Paint & Varnish Co., Philadelphia, Pa.

THE use of graphic charts to record and compare the relative qualities of metal finishes is a little-known factor in the average finishing department. In fact, it is almost virgin ground for the user of finishing materials, its use having been limited pretty much to the laboratories and research departments of the manufacturer of finishing materials.

Yet today, with the passing of rule-of-thumb methods of test and comparison, there is every reason why the results of scientific test and comparison, as well as the standards to be achieved, should be scientifically recorded. Such comments as, "Flexibility—good," "Durability —fair," and so on, are purely relative, and do not give exact, mathematically measurable information. Charts, however, can be made to present the facts accurately, comprehensively, and graphically.

Take, for example, the tensile strength chart. The finisher will want to know something about the actual film of his varnish, lacquer or enamel, and one of the more important and easily determinable features is its tensile strength. How far will it stretch under various loads without breaking? Is it strong, but too brittle; is it flexible, but too distensible? This data may be represented by means of a chart showing tensile strength curves. A chart such as this is shown in Fig. 1. Here the ordinates are loads in kilograms per square centimeter and the abscissas are elongations in per cent. It will be noticed that each curve continues to a certain point and then stops abruptly. This is the point at which the film broke. Thus, in this chart, curves which approach the vertical indicate films that are strong, but brittle. They will endure a considerable load before breaking, but will not elongate or stretch sufficiently to meet the demands of a flexible lacquer.

On the other hand, curves that distinctly approach the horizontal indicate films that are flexible, but soft. They will stretch considerably, but will not endure a heavy load. The most desirable film would be represented by a reasonably long curve, about midway between the horizontal and the vertical; that is, at approximately 45 degrees. The theoretically perfect film, from the standpoint of strength and flexibility, would be represented by a straight line from the point 0 to beyond the point where the horizontal line 280 intersects the vertical line 80. It might be Exhibit A in the "finisher's paradise," but has not yet been discovered on this planet.

There are simple machines on the market for testing tensile strength, such as the Gardner Parks Film Tester, and the Rumpometer designed by Wolff & Zeidler of Germany. These are valuable not only for the testing of new materials but to periodically check up on standard products. Such

a check-up, prior to application, would undoubtedly forestall many finishing complaints from customers. For it has been found that films having good tensile strength and elongation, in addition to being flexible, are also correspondingly resistant to weathering.

Rectangular Co-ordinates

The various qualities of a thinner may be represented graphically by means of rectangular co-ordinate charts. Where the material to be charted has but two variables, each dependent upon the other, this type of chart is extremely serviceable. Take a lacquer thinner for example. The two variables might be (1) the boiling points of the solvents and (2) the percentage of the thinner distilled. They are dependent variables, for the percentage of the thinner that distills depends upon the temperature to which it is heated, and will vary as the temperature varies.

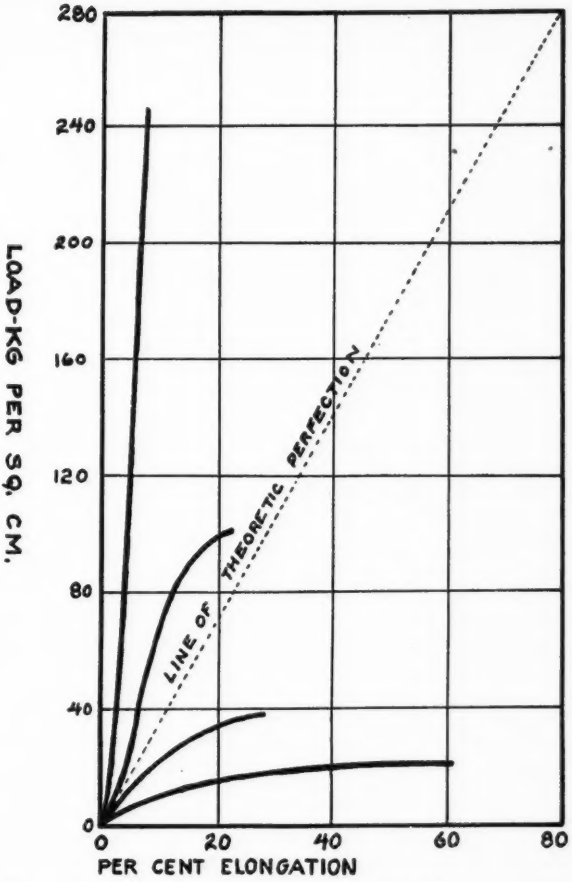

Fig. 1—Tensile strength data can be represented by curves on a chart such as this.

In reading such a chart (generally known as Boiling Point Curves) the finisher discovers a great many things about the thinner it represents—assuming, of course, that it is drawn accurately. For example, if he sees a line that is horizontal (parallel to the base line "Per Cent Distilled") he knows at once that the thinner it represents is a pure compound (except for the curved ends which represent slight and unavoidable impurities) composed, probably, of only one pure solvent. Because the boiling point of a pure solvent is constant, he can also tell whether that one solvent is a high or low boiler, that is, whether it evaporates rapidly or slowly under normal temperatures by noting its elevation on the chart. Line A in Fig. 2 represents a practically pure thinner.

The line C tells quite a different story. Since it describes a 50 deg.

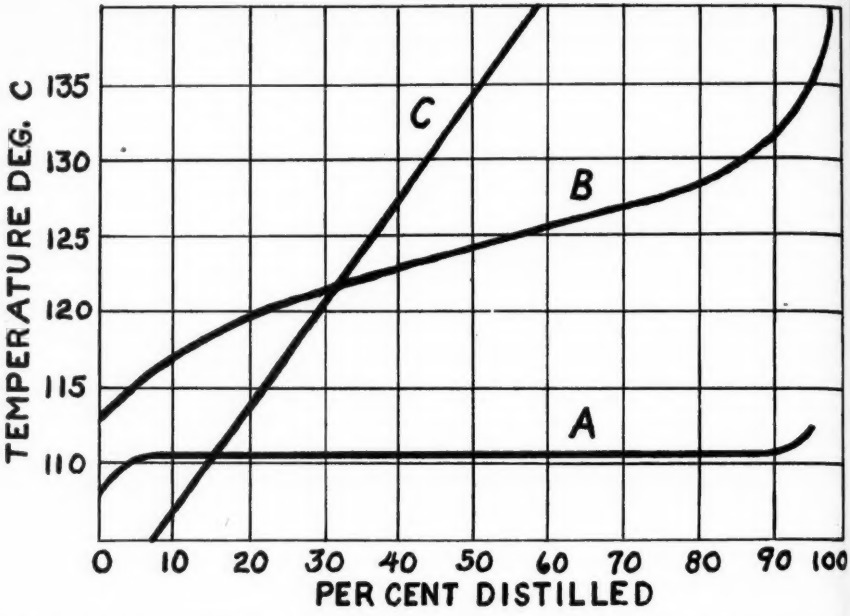

Fig. 2—Chart for representing graphically the various qualities of a thinner. A represents a practically pure thinner, B a thinner containing more solvents than A, and C a thinner of very complex composition.

angle with the base line "Per Cent Distilled," it is more nearly vertical than horizontal. The further we get from the horizontal line and the nearer to the vertical in this type of chart, the more complex is the composition of the thinner. Theoretically, we might almost say that if the line were absolutely horizontal the thinner would be composed of but one pure solvent, while if the line were absolutely vertical, the thinner would be composed of an infinite number of solvents. We would have to put into the distilling flask an endless chain of solvents having infinitely graduated boiling points in order to get a vertical line.

This is somewhat impractical, so vertical "curves" never appear on these charts. If you ever come across one, you can say, like the awed spectator at the fish aquarium: "The man who caught that one was a liar!" And, unlike the spectator, you would be telling the truth.

Seriously, however, a line like C has some definite information to give the finisher. He knows that the thinner it represents must contain several different solvents, all with different boiling points; that some evaporate quite rapidly, while others evaporate slowly. Since this line intersects the line A, it is obvious that thinner C contains some solvents that will evaporate more rapidly than the A solvent (having lower boiling points than A) and that it also contains solvents that evaporate more slowly than A. It must be, therefore, a thinner containing a large number of homologs (homologus compounds), such as we find in mixtures of petroleum hy-

drocarbons.

Line B obviously represents a thinner containing more solvents than that represented by line A, and fewer than that represented by line C. It is, in fact, more nearly representative of an actual thinner, whereas lines A and C are extreme and are shown merely to illustrate the possibilities of the chart.

Similar to this boiling point chart is one showing evaporation curves under normal and constant temperature. In such a chart, the vertical "per cent distilled" lines would become "per cent evaporated" lines, and the horizontal lines "temperature deg. C" would be changed to time in minutes and hours. The principle of both charts is the same.

Triangular Co-ordinates

There is another form of graphic chart, somewhat more complicated, but particularly adaptable to the study of finishes and thinners. This is the triangular co-ordinates graph, used to represent the behavior of a system containing three variables, each varying, but whose sum is constant.

Before explaining how this chart may be used and interpreted in the study of finishing material, it might be interesting to show how it may be applied to any system of three variables whose sum is constant, just as the more familiar rectangular co-ordinate chart may be applied to any system of two variables—such as time and the price of stocks.

The graph is not nearly as complicated as it looks. It can be used for something as simple as, for instance,

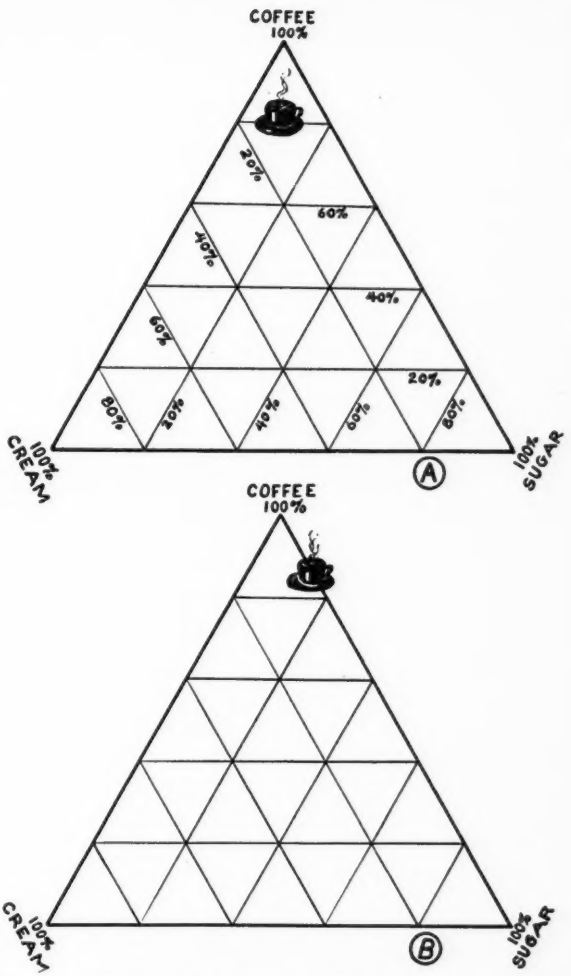

Fig. 3—Diagram illustrating the principle of the triangular coordinates graph. A shows the result when cream and sugar are used with coffee and B the result when cream alone is used.

a cup of coffee. The average cup of coffee, ready-to-drink, and placed on a triangular co-ordinate graph instead of the dining-room table, would look like A in Fig. 3. But, if you never use cream, the chart would appear like B in Fig. 3.

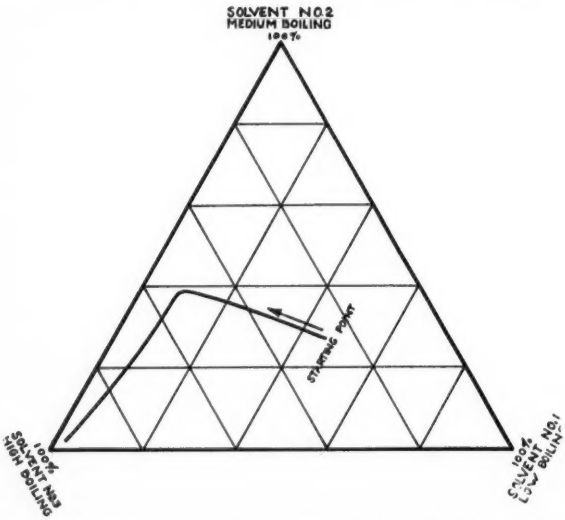

Fig. 4—Any thinner composed of three solvents having varying boiling points may be indicated in a graph such as this.

Each of the three apexes of the triangle represent 100 per cent of a certain ingredient. A product made up entirely of one ingredient would simply be a dot at the corresponding apex. A two-ingredient product would be somewhere along the outside rim of the triangle, at a point between the two apexes representing the two ingredients in question. Obviously, however, the purpose of this type of chart is to represent a three-ingredient product.

Any mixture containing three substances is represented by a point on the chart, its location being determined by the percentage of each substance contained in the whole mixture. Mathematically speaking, we are able to use these triangular graphs with accuracy because the sum of the perpendiculars, from any point in an equilateral triangle to the sides, is constant.

So long as we are dealing with a mere point in the graph, we must assume that the mixture represented by that point does not vary; it always contains the same percentage of each of its three substances. However, some products, such as lacquer thinners, do not long retain their original constituents, but release one solvent after another as evaporation takes place. Thus time and change enter into the picture and our dot or point becomes a curve, or series of points. Thus, any thinner composed of three solvents having varying boiling points, may be indicated in a graph similar to Fig. 4 by a curved line, and any given point in that line will reveal the composition of the thinner at that particular point in its evaporation stage.

The chart has many other uses, but what we have said will serve to give the general principles involved in its construction and interpretation.

In a short article of this kind it has been possible only to offer what might be termed a preface to the use of graphic charts for the testing and comparison of finishing materials. In attempting this, we have illustrated the use of only a few charts of different types. Yet, by applying these principles in other cases, the manufacturer may chart almost any test or series of tests. Master charts

may be used to record accepted standards, and testing charts used for comparison with each other and with the standards.

We do not pretend that the use of such charts is practical in all cases, but do believe that they could be used to advantage in a great many instances where they have, so far, not even been considered.

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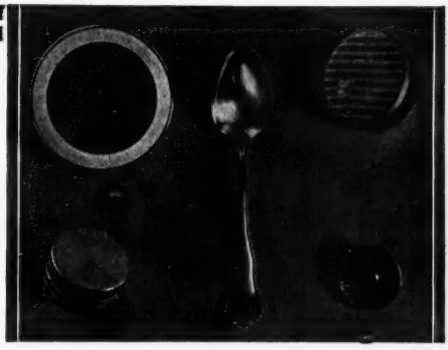

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Pigments for the Modern Finish, II

By Allyn K. Thayer
C. K. Williams & Co., Easton, Pa.

THE oldest of the white pigments is white lead, a term properly applied only to the hydrated basic carbonated lead. It has been made and used continuously for more than two thousand years. While white lead can be prepared by a number of processes, no other seems to produce a product of as desirable physical properties as the Old Dutch process. In this process the lead is cast into perforated plates called buckles which are placed loosely upon each other in a crock of a shape shown in Fig. 1, the ridge formed by the construction of the crock supporting the plates. The crocks are placed in rows, one above the other, and separated by layers of tanbark. The tanbark slowly ferments, generating carbon dioxide. Sufficient heat is evolved in this process to vaporize the acetic acid. Through the action of the acetic acid and carbon dioxide, the lead is slowly converted into white lead.

Another white pigment derived from lead is sublimed lead, or basic lead sulfate. By some it is regarded as an inferior substitute for the carbonate, but hardly with reason, as it is far more stable than the latter and is resistant to sulfur dioxide, so frequently present in the atmosphere of industrial districts.

The oxide of zinc, another white pigment, is extensively employed in finishing materials. The oxide produced from the ores of zinc is known as American process while French process zinc oxide is made from the metal, which has first been extracted from the ore. The French process zinc oxide is generally whiter and of greater purity. Certain ores containing both lead and zinc are processed to make a combination pigment of zinc oxide and lead sulfate that is known as leaded zinc. This pig of several proportions of lead and zinc, is used largely in house paint.

Another combination white pigment is lithopone, an intimate mixture of zinc sulfide and barium sulfate, produced by co-precipitation from solutions of zinc sulfate and barium sulfide. Much control is possible in the precipitation and the subsequent calcination, consequently a large number of variations are possible, making lithopone available in numerous qualities, each designed for a definite purpose. The tonnage of lithopone used is very large. Small quantities are imported but virtually all the domestic demand is produced domestically.

Titanium dioxide and its combinations with calcium and barium is one of the most used of the newer pigments. It possesses extreme whiteness as well as great hiding power or opacity. The source of the titanium is the mineral, ilmenite, although small quantities of other titanium-bearing minerals are used.

Pure zinc sulfide is now finding some use, either alone or in combination with calcium carbonate, silica, or other inerts to impart specific properties.

This covers the field of the active white pigments used in greatest volume, but small lots of others are used for special purposes.

Blacks

That Protean element, carbon, is the essential of the active black pigments. It is the chief constituent of all organic matter, so that when almost anything not a mineral is burned with too little air, a black residue is left. However, only a few substances lend themselves to the commercial manufacture of blacks of pigment value.

Natural gas, burned incompletely, is the source of what is known in the trade as carbon black or gas black. Gases from different fields produce blacks of quite different characteristics. Also, by varying the burning conditions, the blacks made from one gas can be altered considerably. The cheapest gas black, which means, of course, that of the largest yield per unit of gas burned, is the most common. However, the largest use for this is not in the finishing material industry, but in rubber. And not for its color is it used here, but for the interesting property it has of lending abrasion resistance or toughness to such things as rubber tires. It is suitable too for the cheaper grades of black paints and enamels, although where the blackest color is required, such as in automobile finishes, we go to the so-called color blacks. To produce these blacks which are of high intensity, the yield is so low that the cost mounts considerably, some of them selling for ten times or more the price of the ordinary gas black, or channel black, as it is termed.

Lamp black, also a virtually pure carbon, is the term given to the product of the incomplete combustion of oil. While the better grades of lamp black are dense enough to be used for black finishes, by far the greatest use is for the production of grays. Their value here is due to the fact that the gray made by adding good lamp black to white is of a pleasing bluish-gray hue, not dirty or brownish. While the use of lamp black does not total the immense tonnage of gas black, it is of considerable economic importance.

Bone black is a descriptive name,

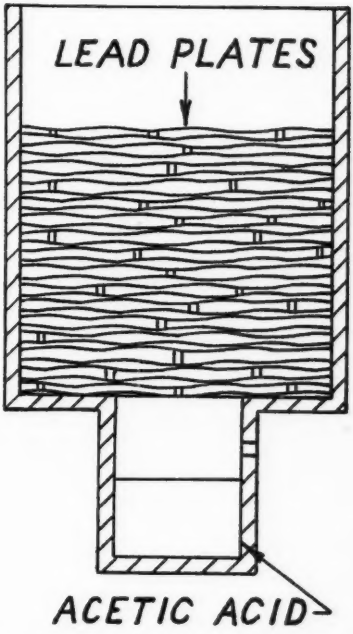

Fig. 1—Diagram of crock in which white lead is made by the Old Dutch process. Layers of lead plates are placed in the crock, the lower portion of which is partly filled with acetic acid.

for it is made by charring animal bone. Bones from different animals and different bones from the same sort of cattle produce variations of black. The dried bones, product of the packing house, are crushed and screened, then placed in iron retorts and heated sufficiently to drive off the volatile matter. When the char is cool, a series of grinding and mixing operations follows. Bone black, due to the

inorganic content of the bones, runs only nine to fifteen per cent carbon, the remainder being largely calcium phosphate. Thus the tinting strength is low, but the solid color is of a character not to be found in gas black or in lamp black.

Chemical Colors

Under this heading, we find the greatest number of coloring pigments, man made, and not found in nature. In a few cases this latter is not strictly true, but in these instances man has improved on nature, either in uniformity or abundance.

For the purposes of description we will divide this class of colors into inorganic and organic. In the first division we will place those colors made chiefly from inorganic chemicals, and in the second division the lakes and toners made from organic intermediates and dyestuffs.

Inorganic Colors

Yellows

The great bulk of yellows are of the group known as chrome yellows. They are made by combining a soluble lead salt, such as the acetate or nitrate, with bichromate of soda. The medium shade is largely normal lead chromate, while the deeper hues or oranges are basic lead chromate. In the lighter ones lead sulfate is coprecipitated. This is necessary and not to be considered adulteration unless carried to an extreme. As these colors, and as a matter of fact most of the chemical colors, are produced by the wet method, it is necessary after precipitation to wash, filterpress, dry and pulverize them. By altering the process somewhat it is possible to make a great number of variations from the lightest, known as primrose yellow, to the deepest orange. Practically, though, every manufacturer has a fairly small number of standard colors.

Zinc yellow is zinc chromate, or perhaps a complex zinc and potassium chrome salt. It is an extremely light greenish yellow used alone, for blending with greens, and in rust-inhibitive paints.

Cadmium yellows are cadmium sulfides or a mixture of that chemical with barium sulfate. They are more resistant to heat and other deleterious influences than the chrome yellows, but their use is limited due to their high cost.

Reds

Cadmium sulfide in combination with selenium makes reds of various shades. They have the same general characteristics as the cadmium yellows.

By increasing the basicity of the chrome oranges, a yellowish red known as chrome scarlet or American vermilion is produced. It is not used very much any more, except as a rust inhibitor in special cases.

Vermilion is mercuric sulfide, a very bright scarlet powder, the heaviest pigment known, having a specific gravity of 8.2. It is one of the oldest pigments and has largely been replaced by others and is used today only in relatively small quantities.

Blues

Chinese blue, prussian blue, milori blue, and so on, are names given to the iron blues. They are formed by precipitating ferrous salts with sodium or potassium ferrocyanide, the resulting white precipitate being oxidized to a blue. Iron blues can be made to vary greatly in all their properties. They possess good resistance to fading and make pleasing light blue tints with whites, but are extremely sensitive to alkalies.

Ultramarine blue is made by a fire process and has a singular brilliance. It is very resistant to alkalies but sensitive to acids.

Greens

When chrome yellows and iron blues are combined in the wet state, an intimate mixture of a green color is

formed. This is known as chrome green and is the largest used of the green pigments. It is obvious that, inasmuch as there are so many possible yellows and so many possible blues, there is no limit to the number of greens, varying all the way from yellow on the one hand to blue on the other, and of varying degrees of purity of hue. So you will find in any manufacturer's list more different chrome greens than any other color. These greens have excellent hiding power, but due to the blue content, have a limited resistance to alkali.

Chromium oxide is known as the most stable of the green pigments. It is virtually pure Cr_2O_3 produced by a burning method. Unfortunately, it is lacking in brilliance and strength but stands any sort of punishment, so is used where the most extreme conditions will be encountered.

Guignet's green is the hydrated oxide of chromium. It is much more brilliant than the chromium oxide, although quite transparent. It is used largely to produce bright light tints by mixing with zinc yellow and white. The high price precludes its use for ordinary purposes.

Organic Colors

In this group are found the really brilliant colors used for pigmented finishes. They are made from coal-tar dyes and intermediates, together with various mordants and bases. As dyed fabrics differ in hue and fastness, so do the organic pigment colors. The lakes are really analagous to dyed cloth; instead of the fibre that is colored, it is a base of blanc fixe, aluminum hydrate or other white powder. The dye is firmly fixed on the base, or sub-strata, by means of a mordant, which differs with the dye used. In some cases the dye is produced from the intermediates right on the base which is held in suspension in water in a striking tub. Toners are insoluble dyes and have no base. They are stronger than the lakes but in general of harder texture and so require more grinding to incorporate with a vehicle, such as varnish or lacquer.

Reds

It is safe to say that more red is used than any other organic color. The word red covers everything from something just beyond orange to the deepest maroons.

Probably the greatest volume in the reds is in that useful color referred to as para, both toner and lake. Para reds are made by combining, under carefully controlled conditions, the intermediates para-nitro-aniline and beta naphthol. They are susceptible to considerable variance from light to dark, are quite fast to light and are of moderate cost.

Toluidine red is made by coupling meta-nitro-para-toluidine with beta naphthol. It is the familiar "fire department" shade and is used where a very fast, very bright red is wanted. The cost of the toner is nearly twice that of the para toner.

Lithol reds are made by coupling the complex intermediate called, for short, Tobias acid, with beta naphthol. The sodium, barium and calcium salt are all used, the former being the most yellowish, the latter the most bluish and the barium salt in between. The lithols are of about the same cost as the paras but stand heat better and are non-bleeding, so are suitable for finishes to be baked or striped. However, they do not stand outdoor exposure as well as the paras or toluidines. While these three classes of reds are responsible for the greater part of the organic reds used, there are many others in regular use and very many others possible of manufacture were a demand to exist.

Yellows

The chief organic yellow is hansa, of great permanence and strength. Certain transparent yellow lakes are

made use of in stains and thin lacquers. They are usually of tartrazine or other yellow dye on an aluminum hydrate base.

Blues

Blue lakes and toners of great brilliance are made from such dyestuffs as victoria blue and methyl violet. The old mordant was tannic acid but recently tungstic and molybdic acids have come into use, making possible much more permanent colors.

The most recent blue pigment is the new pathalocyanine compound discovered in Switzerland a few years ago. It is said to be the first really new blue since ultramarine was discovered in 1826. It seems to have many superiorities over other blues, being exceptionally fast to acids, alkalies and to light and heat. This blue is high in strength and of great brilliance.

All the colors considered in this paper come to the user in the form of a fine dry powder, packed in barrels or kegs. The customary method of use is to combine the powder with oil or varnish on a stone or roller mill, thus producing a paste which is used by the enamel or paint maker as his base for the further addition of thinner, dryer, varnish and so on. Considerable interest has been shown recently in "flushed colors." In making these, the wet precipitated mass is agitated with a suitable oil which, by reason of its greater affinity for the color, drives off the water and leaves an oil-color paste. As the steps of drying and pulverizing are omitted these flushed colors are said to have the particles in a much better state of fineness and dispersion, with consequent maximum of coloring and tinting strength.

The literature on the making of pigment colors is extensive and many patents have been allowed on certain phases of the art, but the practical kinks and tricks of the trade are rarely committed to paper. As they are known to but a few, certain manufacturers are generally known as the best source for certain colors.

While we have given an idea of the source and character of the principal colors of the various classes, there are literally many hundreds of white and colored pigments available. Thus it becomes a tremendous task for the modern manufacture of product finishes to select just the ones to give precisely the results demanded for the specific job in hand.

Century Slip Ring Motors. This eight-page folder describes and illustrates the line of 1 to 350 h.p. slip ring motors manufactured by Century Electric Company, 1806 Pine St., St. Louis, Mo. These motors are recommended by the manufacturer for any application for which the characteristics of a wound rotor motor are suitable, such as, for fans and blowers, hoists, conveyors, pumps, gates, elevators, and so on. The motors are built for continuous duty, open and enclosed ratings, or for intermittent reversing application, short-time duty rating, and are available in open, drip proof, splash proof, fully enclosed and gear head types for horizontal and vertical operation. Copy free upon request.

Telemetering Bulletin No. 490. Typical examples of telemetering and remote control by means of Bristol's Metameter are shown in this new publication by The Bristol Company, Waterbury, Connecticut. It explains in diagrammatic form how these instruments measure, transmit and record readings over a simple two-wire circuit where the transmitter and receiver are any distance apart.

Bristol's complete line of Metameter telemetering instruments for recording or indicating at a remote point from the measuring element includes those for transmitting pressure, liquid level, flow, temperature, mechanical motion, electrical units and totalized power load. By means of Bristol's Metameter Controllers, pressure, liquid level, flow and temperature are controlled at a point remote from that at which the measurement is made. A copy may be obtained upon request.

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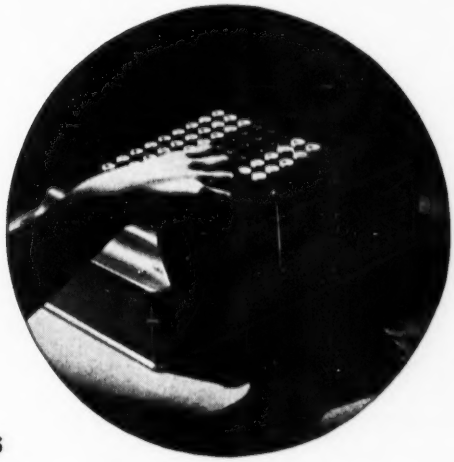

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NORTON ABRASIVES

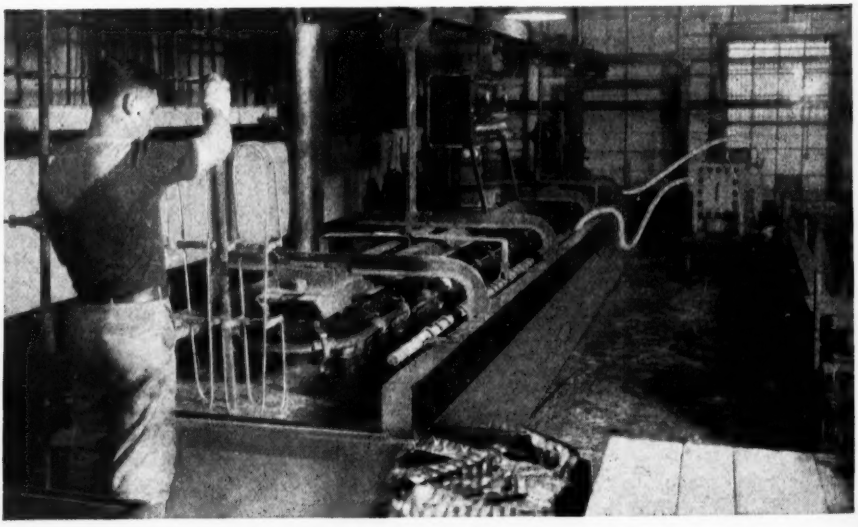
Plating Procedure at Metal Mouldings Plant

By J. C. Guenther

MOULDINGS were undoubtedly originated for the purpose of concealing joints or crevices, screw heads, rivets, and other fastening devices. However, the very fact that the moulding broke the line of the surface and often projected from the surface attracted attention to it and thus made it imperative that such mouldings be of attractive design. In our modernistic "streamline" designs, however, whether the design be intended for an ocean liner, airplane, automobile, or building, mouldings are often used for purposes of beauty alone. Thus the demand for mouldings of special design and modernistic finish has fostered a new industry.

Inasmuch as a great part of the demand for special mouldings originates in Detroit, it is to be expected that a plant that is equipped to meet this demand would be found there also. Such a plant is the factory of the Metal Mouldings Corporation. The Metal Mouldings Corporation produces moulding designs, practically all of which are plated. Inasmuch as plating plays such an important part in the finishing of the mouldings, the plant equipment includes a first class plating department, several views of

Fig. 1—View of plating department showing a portable filter in the background with hoses extending into the tank.



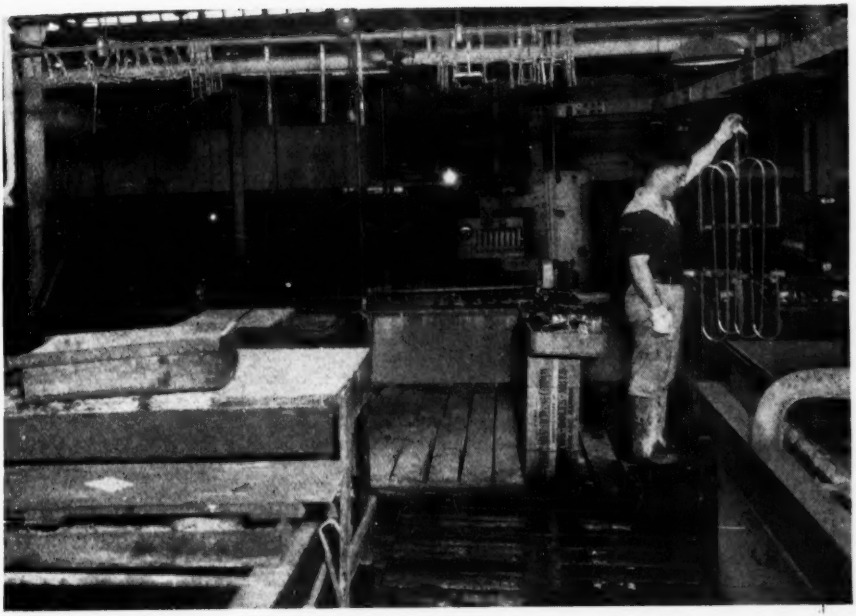


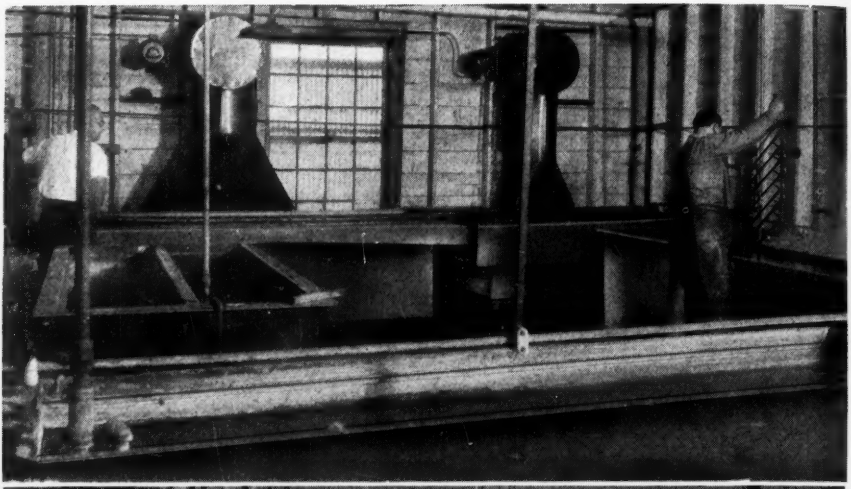
Fig. 2—The operator is removing a rack of mouldings from the copper plating solution preparatory to nickel plating.

which are shown herewith.

As the mouldings come from the presses in which they are shaped, they are first conveyed to the polishing department in which scratches and burrs that would clearly show through the plating are removed. A large portion of the mouldings that require polishing are of such intricate design that hand polishing is necessary in order to thoroughly cover the curves and crevices. For a large portion of the work, however, special holders have been devised on which the work can be polished at production speed.

After the surface imperfections have been removed, the mouldings are transferred to the degreasing tank in the plating department. Here they are degreased and rinsed, and are then subjected to a five second copper strike. The thickness of the copper deposited in this manner is usually around 0.0001 inch. Two general views of the plating department are shown in Figs. 1 and 2. In the foreground in Fig. 1, the operator can be seen removing a rack of instrument panel mouldings from a Udylite semi-automatic nickel plating tank. The conveyor of this particular plating tank is equipped with hooks to accommodate 42 racks of work. The conveyor makes one complete revolution every 45 minutes, this being the time required for a deposit of 0.001 inch. Located at the far end of the Udylite tank is a portable filter. This type of filter unit is very effective in keeping the nickel solution free from harmful sludge.

Following nickel plating, the mouldings are chromium plated in the department illustrated in Fig. 3. The tanks required for the various steps



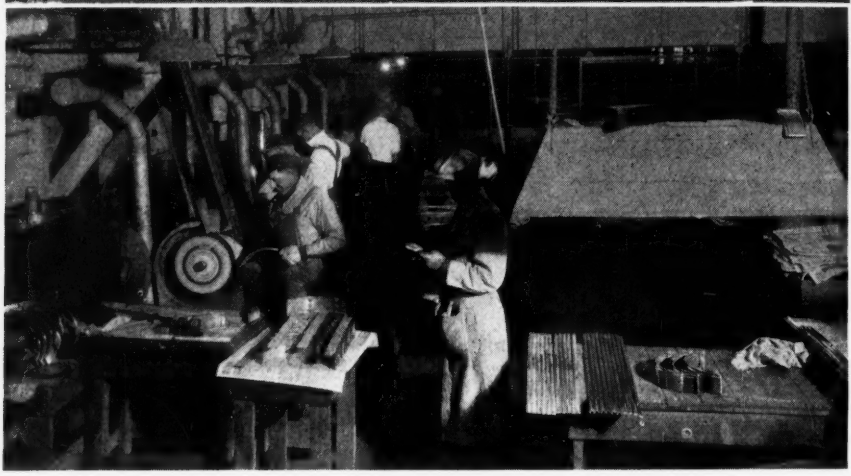


Fig. 3—(Above)—Chromium plating department. The tanks are arranged so that the racks of moulding can be conveniently transferred from one tank to the next.

Fig. 4—(Below)—One section of the buffing department. Each piece of moulding is carefully buffed in the "hard to get at" crevices.

in the chromium plating cycle are conveniently located in a square, thus the operator saves time in transferring the work from one tank to the next. Each chromium plating tank is provided with a ventilating hood and duct through which the fumes are drawn directly to the exterior by means of a blower.

When the mouldings have completed the full plating cycle, they are transferred to the buffing department, a section of which is shown in Fig. 4. At this point, the mouldings are care-

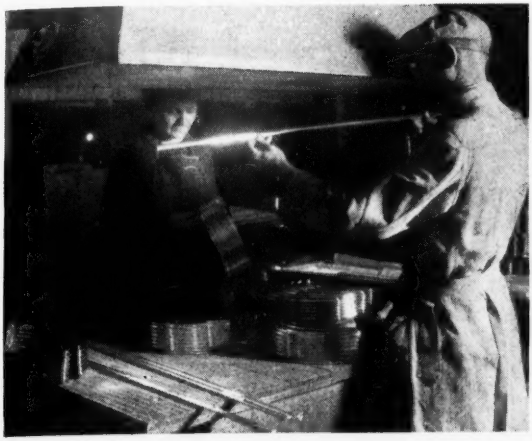


Fig. 5—Inspection table. A sufficient amount of diffused light is provided, thus making the slightest imperfection readily perceptible.

fully color buffed and prepared for the final inspection.

Inspection is facilitated by a lighting unit containing three 100 watt bulbs so arranged that the light is diffused through a ground glass plate, thus providing a light which is brilliant and at the same time is evenly distributed so that even the slightest imperfection is brought into glaring relief. Figure 5 shows one of the inspectors holding a strip of moulding under the light while the surface is examined. The inspection table is located between the buffing department and the packing department, at which point the mouldings are made ready for shipment.

A. I. A. File No. 15-H-12. This is the designation of a beautiful 16-page catalog which describes the architectural use of porcelain enameled iron, now being issued by Ferro Enamel Corporation, 4150 East 56th St., Cleveland, Ohio. Included in the catalog are pictures of actual constructions projects and drawings which show the type and method of construction used. Copy of Catalog A. I. A. File No. 15-H-12 free upon request.

"Over the Rough Spots." A guide to successful methods of keeping factory floors, roofs, walls and foundations in good repair has been issued by the Stonhard Company, 401 North Broad Street, Philadelphia, Pennsylvania. The book contains 24 pages, profusely illustrated, and is designed so that plant superintendents, maintenance men, and purchasing agents can gather a wealth of information from its pages. Among subjects discussed are "Lengthening the life of concrete and wood floors," "Leveling rough spots and worn places in all types of floors and trucking aisles," "Roof waterproofing methods," "Waterproofing masonry against hydrostatic pressure."

A copy of this book will be sent to any plant executive upon request.

"Hanson-Van Winkle-Munning Rectifiers" is the title of a bulletin which is now being issued by the Hanson-Van Winkle- Munning Co., Matawan, N. J., in which electroplating rectifiers as a source of direct current are described. This bulletin, designated as No. ER-101, includes a cut of the rectifier, information as to the construction, installation, and operation and also contains a graph showing the power factor and efficiency curve. Copy of Bulletin No. ER-101 free upon request.

Blue Knight Taupe No. 978 A. This is the title of a product summary now being issued by Roxalin Flexible Lacquer Co., Inc., Box 775, Elizabeth, N. J., giving properties of a specially pigmented enamel of neutral color. It does not show finger marks, dust or minor defects. Copy free upon request.

"Powerduct Cable" is the title of a four-page folder, now being distributed by Anaconda Wire & Cable Company, 25 Broadway, New York, N. Y., in which the use of Powerduct Cable in one of the large automobile plants is described. Actual installation photographs and a cross-section drawing showing the construction of the cable are included. Copy free upon request.

Barrel Finishing of Metal Products

Eighth Article of Series—Factors in the Selection of Fibrous Materials for Drying Out, Polishing, Cutting Down and Matte Finishing

By H. Leroy Beaver

PART I

IN all of the preceding papers on the subject of The Barrel Finishing of Metal Products, we have dwelt on application of metallic burnishing materials—specifically steel balls and other shapes for carrying out the burnishing process. In this paper, we depart from the above materials to discuss an entirely different phase of the subject, and which we may note might become highly controversial for our knowledge of its various applications and possibilities is still very much limited in scope. We do believe, however, that in this simple discussion we might be able to point out the way to others interested in barrel finishing to pursue experiments in their own way, with the end in view of producing finishes and especially matte finish far more economically than they have ever been produced before.

Even in the course of the papers preceding the current one, we have been asked time and time again how we manage to conduct the number of experiments we do without so impregnating the lining of our laboratory barrels to such an extent and with various materials, that we would find it difficult to say just what combination of materials had actually produced the conclusions as stated from time to time. In explanation we would say that were it not for the fact that we have been able to so construct our equipment that instead of the expensive regulation wood barrels, we utilize comparatively inexpensive cypress wood tubs, called "kanakins" in the trade, and which we might more easily describe to the reader as pails wider at the bottom than at the top and such as mince meat is usually packed in. These are of eight quart capacity, and all our laboratory work is done with a load of 64 pounds of various steel burnishing forms or with six quarts of dry materials.

By pulley combinations and changes we can utilize 20 different barrel speeds and as our equipment can be operated at any point over the arc of a quarter circle, we can have as many as 200 operating conditions. Through carefully worked out tables we then approximate the results from this equipment in terms of what might be had in either, or in fact, any size of the average commercial barrels. We know of no case where we have been unable to produce in a commercial barrel the exact results we secure in our laboratory equipment. Our individual units are very simple in construction and comparatively inexpensive, and as the cost per kanakin of each experiment is but 90 cents, we generally discard the kanakin after each experiment and start with a new one, and especially this is true where abrasive or chemicals of any

kind are used.

For any barrel manufacturer to undertake to conduct as many different experiments in regular commercial barrels as we do, would be absolutely ruinous from the cost standpoint, as it would require complete new liners for each barrel used, and this may in a way explain why barrel manufacturers for the most part have seemed so completely indifferent to developing new methods and processes with various materials. If any of our readers would care to set up their experimental or laboratory set, we would be glad to supply them with complete information as to just what we use and how we use it.

These laboratory sets are very effective for doing small lots and if more manufacturers would install them and conduct experiments along various lines, it would not be long before our knowledge of barrel finishing and its possibilities would be much extended. As we have previously said, the subject has so many phases that it is absolutely impossible for one mind to encompass them all, or for one research organization to keep up with the work demanded from it, because all of these determinations require time and study.

Continually the question arises "What can we do with respect to finishing parts made from very light gauge materials, such as vanity cases, lighting fixture parts, ferrules, and so on." To undertake to finish products coming within this class in the conventional burnishing barrels with steel burnishing materials, has always meant, if commercial loads are to be operated, the likelihood of appreciable permanent distortion of the parts, except in those isolated cases where the parts were operated in the small sectional barrel compartments of Type "T" or tubbing machines, where only about one quart of materials could be operated on at one time.

The barrels we have previously discussed have, with the exception of the tubbing machines, all been of the conventional cast iron shell either plain for cutting down work or else lined with maple for burnishing and final finish. Now obviously with development of a lighter burnishing material a lighter barrel should also be considered, but first let us discuss the burnishing material.

In determining a satisfactory light material we have examined and tested a score of products which we have finally narrowed down to three, which we describe as follows:

1. Sugar Cane Fibre, or what is more strictly termed "bagasse". When sugar canes are taken to the mill, they are run through crushers after which by various processes all of the sugar sap is extracted and the resultant product resembles very coarse white rattan or straw averaging from ¾ to 1½ inches in length and from ⅛ to ¼ inches in section. There is no residue of sugar in this material and it is almost pure cellulose.

2. Crushed Yellow Corn Cobs. This material is composed of the ordinary cob of yellow field corn which has been aged for at least one full season and preferably air dried. These cobs are run through a crusher, the resultant product being hard fibrous jagged pieces very irregular in form and averaging approximately from ¼ to ¾ inches in size.

3. Commercial Cork Bark. This is simply the cork bark slabs as received in the open market and put through a crusher exactly the same as the yellow corn cobs, the resultant product having much the same size and appearance as the crushed cobs, but being far more resilient.

Now in preparing the above materials for use the procedure is much the same as in setting up an abrasive wheel. We place the material in a revolving open end drum tilted to about 45 degrees. With the drum in

operation we have an action not unlike that of a tilting horizontal tumbling barrel. Now, depending upon the type of abrasive used, we spray this revolving mass of material with a hot flexible glue solution until the entire mass takes on a glossy appearance, at which time it is ready for the application of the abrasive or polishing material. This is simply dusted into the drum or barrel, where as the material is revolved, it takes on a coating of the abrasive. In any of the three materials the abrasive may be added to what we might call the saturation point because the glue coating will absorb and hold on its surface only so much abrasive material.

The same rule of application may be used as in setting up a wheel, that is, the lighter and finer in grain the abrasive, the lighter should be the glue coating. In other words, more water should be added to the glue base for fine grain materials than for coarse. After the coating process, the material is poured from the barrel and spread evenly on large wax paper sheets and allowed to dry for a firm setting for at least twenty four hours.

A partial list of abrasive and polishing materials we have used in this way are:

Silica Flour
Corundum
Turkish Emery
Pumice
Rouge
Chromium Oxide
Crocus
Carborundum
Precipitated Chalk
Rose Tripoli
Vienna Lime
Kieselguhr
Rotten Stone
Talc
Pulv. Oyster Shell
(Calcium Carbonate)
Aloxite
Crushed Steel Grit

Now the question might well be raised, "Why go through all of this detail, and why not simply place either of the three Carrier Materials into a barrel along with the parts to be finished, add the proper abrasive and proceed? Wouldn't the final results be the same?" The answer is definitely "no."

In several previous papers we have stressed the fact that, the relation of specific gravity always applied in every barrel finishing operation. In this particular case we have a two-fold application of the principal. The material we are attempting to describe is suggested as a definite step forward from the old operation of mixing commercial saw dust and an abrasive and operating parts in a barrel either for removing burrs and fins or scale as well as for producing the various degrees of matte finish.

Irrespective of their characteristics there is no cellulose or fibrous material that would be suitable for the purpose that will equal in weight or show the same approximate specific gravity as any of the abrasives operated with it, hence when saw dust and an abrasive are mixed and operated in a barrel without a binder, the tendency will be for the heavier abrasive material to find its way to the bottom of the barrel. It is true that saw dust, being jagged in character will hold a certain amount of abrasive material but in wood barrels we have found as much as 40 per cent of the abrasive in the bottom of the barrel and in sheet metal barrels the proportion is sometimes up to as much as 65 per cent. Now any abrasive material unless brought directly into contact with the work and under pressure is practically useless.

The reader will clearly see that where an abrasive is held to the base medium by a flexible glue base, that as nearly as possible to 100 percent of efficiency is delivered. This, of course, covers the first phase of the specific gravity relation and the sec-

ond phase is the relation of the specific gravity of the abrasive coated material to the parts to be operated upon, and it will be invariably found that with light gauge metal parts the relation will be such that no difficulty will be met with in keeping the parts confined well within the mass.

Having specifically in mind a manufacturer of wood pen holders with metal ends, a coated material such as the above functions beautifully in smoothing the wood holders as they come from the automatic turning machines and prior to enameling. (The metal ends in the meantime being barrel burnished in the conventional way). Indeed, any product that would be subject to attack by a specific abrasive, may be successfully handled in this way. A number of years ago, and in some present instances, in finishing small wood turnings, sand paper was torn into small pieces and added to the load in the barrel, but a coated material functions far faster and better. In one case we coated a quantity of hard wood planer chips and used them in this way with splendid results. We mention this work on wood materials for the reason that in some manufacturing establishments where novelty articles especially are made, both the wood and metal work is finished completely in the one plant. There are many cases where parts are first operated with coarse abrasive followed by a second operation using a finer or finishing abrasive on the theory that production time is conserved, but in general we believe the best results will be secured with the use of the finer abrasives only, which, while they may require a slightly longer run, invariably produce more uniform finishes.

While we have been able to secure splendid results from all of the materials described, we believe we can safely say that the abrasive coated cork has been the most satisfactory. Cork, as the reader knows, is resilient and does not readily grind into a powder, as witness the age old gag of the druggist's apprentice trying to reduce cork to a powder in a mortar. Coated cork, even after the abrasive coating has worn away, may be recoated time after time and it provides by far the best and most satisfactory cushioning where solid parts are operated upon as distinguished from light gauge hollow shells.

In using a flexible glue we have a product that never entirely dries and as the abrasive becomes loosened in the mass it is picked up again and again so that very little inert material will ever be found in the bottom of the barrel. The abrasive, being heavier by far than any of the three suggested carrier mediums, is never carried up so high on the inner periphery of the barrel as the carrier medium is carried and there is always more or less slippage of the mass towards the bottom of the barrel on a line drawn downward directly from the centre of the axis of the barrel, and in this slippage the major portion of any loose abrasive material is re-deposited on the flexible glue surface of the carrier medium.

This re-deposition will continue until the material or rather the abrasive surface becomes filled with small metal particles removed from the parts being operated upon, much the same as a wheel fills up on the surface, but in this material we simply re-coat it where in a wheel it must be raked out and the wheel re-set.

Now as to suitable types of barrels in which to operate this type of material. The average commercial barrels, with the exception of the oblique tilting type where the shell is either of wood or sheet metal, are too cumbersome, and light preferably six sided wood barrels with panels as light as ⅝ inch material are entirely satisfactory, and are available in the open market from at least three dif-

ferent sources. As a general rule, neither the abrasive coated material nor the parts are of sufficient weight to require heavy duty barrel equipment.

We may here state as between hard sharp and fast cutting abrasives as represented by carborundum and aloxite and the soft or polishing abrasives as represented by vienna lime and rouge or crocus, that it is a far easier and faster operation to produce scratch brush finishes than it is to reduce the entire surface area of a part to an even plane so that we have as far as possible an equal light refraction from the greater portion of the plane area, in other words a brilliant, limpid or bright burnished finish.

The question that will naturally come to the mind of the reader would be "If parts can be matte or satin finished by the dry burnishing method, why would it not be possible also to dry burnish to a high lustre?" We can, of course, burnish to a high lustre by the dry method, but as we have just stated it must be remembered that it is far easier to put millions of tiny scratches on the surface of a part and very quickly too, than it would be to remove only a small proportion of such scratches accidentally applied. Surface imperfections are hidden rather than emphasized by a matte finish, and a single scratch on the surface of a part, when a brilliant finish is required, means that the entire surface area must be reduced to the same plane as the depth of the scratch to completely eliminate it.

Let us assume for example that we have coated cork with vienna lime for the first operation and with crocus for the second or final finishing operation. Both of these materials may be obtained moulded in tallow base for use on rapidly revolving muslin or other buffs, but here we must consider a very important difference. A barrel, say 24 inches in diameter and 18 inches long of light construction when operated with dry burnishing material may not travel faster than from 30 to 42 r. p. m. Now even if the mass of material and parts followed closely the inner periphery of the barrel the best we could possibly get would be a travel of about seven feet per revolution or an approximate travel of 210 feet per minute.

If we contrast this with the use of a buff and composition we find that peripheral buff speeds of from 6000 to 8000 feet per minute are not unusual. So in most cases of dry burnishing, due to the length of time required to approximate the feet of travel of a buff with equivalent composition, this phase of the barrel burnishing process is one we speak of as being mechanically possible but not commercially practicable.

Very recently we have been asked to comment on a dry burnishing operation, which, as it is now carried out, provides an apt illustration of what we have just said in the preceding paragraph. In this instance, the proposition was the finishing of zinc base die castings by the dry burnishing method, according to the production plan of a prominent exponent of the practice, and the procedure outlined by him is as follows:

Operation No. 1—23 pounds of light zinc base die castings equivalent to about one peck in bulk or 100 pieces of the average finished value of 7 cents each, operated with small steel punchings for removing fins. Average operating time three hours.

Operation No. 2—Same lot of castings operated with 100 pounds vegetable ivory chips and 4 pounds of abrasive treated saw dust for cutting down. Average operating time 4½ hours.

Operation No. 3—Same lot of castings operated with 100 pounds vegetable ivory chips and 4 pounds of saw dust treated with polishing abrasive. Operating time three hours.

Operation No. 4 — Zinc flash —

chrome plate.

Operation No. 5—Same lot of castings operated with 50 pounds of bran and 4 pounds Vienna Lime combined with 2½ pounds of glass rouge (silicon carbide). Operating time 3 hours.

Now it must be obvious that a five part operating cycle consuming 13½ hours of time to finish 23 pounds or 100 parts, of the value of 7 cents each, while it might be mechanically possible, could never be commercially practicable. Since this paper is not intended as a treatise on dry burnishing as such, the above is merely offered as illustrative of the preceding paragraph.

In many of the suggestions embodied in this series of papers, the reader will understand that we are seeking to point out the way, so that barrel operators interested in any one phase of the subject may follow it through, making such modifications as necessary to the particular finishing problem they have in hand.

Obviously, it is understood that we could not conceivably chronicle in complete detail the hundreds of tests we have made in reaching many of our conclusions. To even attempt this would require all of the space of a complete issue of Products Finishing each month. In any of the propositions advanced if any reader desires additional details he has only to make his request to Products Finishing.

Just now we are working on cork covered with 180 emery, and if any reader would like to see a sample of this material we would be glad to send it on request.

PART 2

Fibrous materials as used for drying out parts after burnishing and rinsing.

INASMUCH as this paper deals with fibrous materials and also due to the many inquiries we have had respecting such materials for drying out parts after burnishing and rinsing, the present paper is divided into two parts and in this, the second part, we will discuss this phase of barrel finishing.

Over a number of years we have tested scores of materials for this purpose, some of the better known being listed in the following table where the moisture absorption properties per 100 pounds of material are shown.

100 pounds of Material	Water absorbed in pounds
Mixed Wood Shavings	130
Ground Corn Cobs	210
Ground Corn Stalks	266
Boxwood Sawdust Flour	335
Maple Sawdust	180
Sugar Cane Fibre (Bagasse)	358
Peat Moss (Poultry Litter Type)	400

The reader will note that there is considerable variation in the moisture absorption properties of the various materials listed. Selection of any of the above materials by the user should of course be based on cost, efficiency in moisture absorption and polishing properties, and convenience in securing.

For many years, maple sawdust has been considered supreme as a medium for drying out or sawdust tumbling after burnishing and rinsing. Being an exceedingly hard wood, its absorption properties function rather slowly and it is more as a polishing or buffing medium that it enjoys its widespread popularity.

If we were to select a material solely on the basis of its property to absorb moisture, we, of course, could have only one choice and that would be peat moss. The type we have used in our tests has been termed the "poultry" variety, as it is widely used as a poultry litter. Unfortunately, neither the poultry nor the agricultural varieties are sufficiently free from earth and gritty material to enable them to be used on highly polished surfaces, but in cases where

work is to be rough tumbled, rinsed and desired to be dried quickly and thoroughly, there can be no question of the greater efficiency of peat moss. Even after it is discarded as too fine for the work, the residue finds a ready sale to florists and gardeners where it is used as a medium for breaking up heavy soils, enabling them to retain more moisture.

There are three factors to be considered in the selection of drying out and polishing material. They are as follows:

1. Moisture Absorption.
2. Ability to resist wear.
3. Efficiency as a Polishing Medium.

Inasmuch as all three of the above, and which we consider as desirable and essential properties cannot be secured in any one material, we have combined the best features of four of the materials as follows:

1. Sugar cane Fibre (bagasse).
2. Ground Yellow Corn Stalks (without leaves).
   For moisture absorption.
3. Crushed Yellow Corn Cobs.
4. Maple Sawdust.
   For polishing properties.

Of these materials the ground bagasse, which is almost pure cellulose and the ground yellow corn stalks which contain much pithy fibre are selected for their moisture absorption properties and the ground yellow corn cobs and maple wood sawdust both of which are exceedingly hard, are selected for their efficiency and practicability as polishing mediums.

Of the four methods for handling parts after barrel burnishing and rinsing most commonly used, we find the following:

1. Centrifugal dryers (whizzers).
2. Heated Sawdust Tray.
3. Oblique Tilting Tumbling Barrel.
4. Oblique Tilting Type Heated Tumbling Barrel.

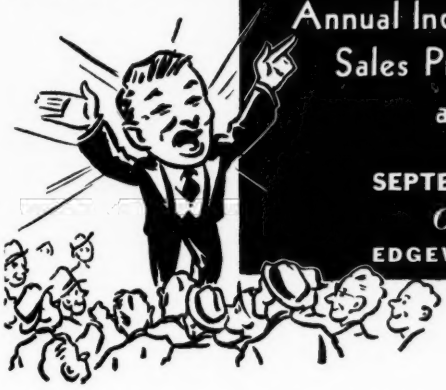
If the centrifugal or heated barrel method is used there of course is no necessity for the use of the moisture absorbing materials and a mixture of ground corn cobs and maple sawdust will suffice as polishing mediums, but in the other methods, we have found it best to use the entire mixture.

The sawdust of gummy or resinous woods is seldom used and has little application in barrel finishing. In some cases, white pine planer chips are used in rough tumbling for removal of excess oil or grease prior to alkaline cleaning operations, but in the final processes of barrel finishing they have no useful application. The rapid passage of parts through a fibre drying material in itself generates heat, and when the gummy or resinous woods are used there is always a tendency for at least a portion of gums exuding from the material and depositing on the surface of the parts where it is not always removed in subsequent cleaning operations and where it seriously interferes with a later deposition of plate or application of lacquer.

Finally, there seemingly should be little or no difference in the manner in which this class of fibrous materials is prepared and yet we find that as between the four materials selected there is a material difference in functioning where the materials are ground in a hammer mill or in an attrition mill, the hammer mill product being what we might term the "steel cut" variety is far more satisfactory than the attrition milled or flat ground or crushed type.

Fairbanks-Morse Fig. 5870 Ball Bearing Centrifugal Pumps are illustrated and described in a new Bulletin No. 5870. These compact, sturdy pumps are built especially for operating at high speeds against heads up to 245 ft., with capacities of from 90 to 225 U. S. gallons per minute. Efficiency and compactness are said to make them desirable for installations requiring high pressures and small or moderate capacities, such as in municipal waterworks, industrial plants, golf courses, parks, and so on. Copy free upon request.

N.I.A.A.



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Finishing Die Castings

By Gustave Klinkenstein

Vice-President and Technical Director, Maas and Waldstein Company, Newark, N. J.

DIE castings make possible so many manufacturing economies, especially in mass production, that their use is constantly increasing. They can be produced in quantity with great rapidity; their dimensions are so accurate that perfect fits are assured without machining; and, since shapes of great complexity can be die-cast, the design engineer can often incorporate in a single casting a score or more of elements that otherwise would have to be fabricated separately.

Die castings can be made from a number of different metals and alloys, but the great majority are made from special alloys, consisting chiefly of aluminum, zinc, or magnesium. These alloys were developed for the purpose by research and possess physical properties that adapt them admirably to the die-casting process. They melt at relatively low temperatures; they are very fluid when molten; they mold well, and are quite strong when cast. Aluminum and magnesium castings are very light in weight.

But in one respect these alloys are far from admirable—they are exceedingly difficult to lacquer. All three of their principal constituents—aluminum, zinc, and magnesium—are frequently called "oily" metals by finishers. They are not actually oily, but they tend to form metallic soaps with certain of the commonly used lacquer bases, and these compounds, of course, destroy the lacquer film.

Because of this action, ordinary lacquers cannot, as a rule, be applied successfully to bare die castings. Before such lacquers can be used, the surface of the casting has to be treated by some process that renders it chemically inert to the lacquer, and even then results may not be satisfactory.

Special "Die-Cast" Lacquers

Recently, special "die-cast" lacquers have been developed which contain substances that inhibit the formation of the destructive compounds. These lacquers can be applied to clean die castings just as they come from the molds. They air-dry rapidly, adhere well, and produce an excellent, durable, elastic finish in a single coat. They can be applied by either dipping or spraying.

The castings must, however, be quite clean. Traces of metallic oxides on the surfaces are likely to cause trouble because these oxides are chemically more active than the metals themselves, and when oxidation once starts, the action tends to be progressive, as in the more familiar case of the rusting of iron and steel.

Clear Die-Cast Lacquers—All three of the die-casting metals can be given beautiful natural finishes by such mechanical processes as polishing, burnishing, scratch-brushing, and sand-blasting. But if the finished metal surfaces are unprotected, or protected by an unsuitable lacquer, they will quickly darken and become unsightly.

These finishing processes, however, very effectively remove all traces of oxide from the metal, so that the resulting finishes can be preserved indefinitely by the new clear die-cast lacquers, provided they are not subjected to unusually severe, or to out-

door service conditions. This permits the designer to obtain readily metallic effects that have heretofore been difficult to secure, such as, for example, bright aluminum or satin-finished zinc, which can be combined most attractively with plastics and other materials.

For out-door service, these lacquered finishes are unsuitable. In fact, die castings that must have a metallic finish that will withstand the elements should be made of aluminum and given an anodic oxide finish.

Pigmented Die-Cast Lacquers—Pigmented die-cast lacquers can be obtained in black, white, and all colors, and in either gloss or eggshell sheen.

Most die castings come out of the molds so clean that these pigmented lacquers can be applied to them without pretreatment. But when the castings are oxidized, or when an especially durable finish is wanted, pretreatment that increases adhesion and prevents the progressive oxidation of the metallic surface is required.

Several solutions are available for this purpose. In some cases, a coating of a metallic salt, such as the phosphate, is formed on the surface; in other cases, a different metal is deposited on the surface in a finely divided form.

When the product is to be used outdoors, pretreatment of this kind before lacquering is essential.

Anodic Colorings—Die-cast lacquers reproducing the colors obtained by the anodic and other chemical processes can now be obtained. These finishes are obtained by mixing clear die-cast lacquer with lacquers colored with special pigments. They can be applied to any kind of die castings and produce clear, brilliant, transparent colored effects that are fast to light and very durable. All known chemical colorings, as well as many novel effects, can be economically reproduced in this manner.

These new colors are being used on lighting fixtures, novelties, casket hardware and other products that are not used out-doors.

Lacquers for Plated Zinc Die Castings—Many products formerly made of other metals are now being die-cast from zinc and plated with brass, nickel, silver, gold, or chromium.

These plated products do not require the use of die-cast lacquers but are finished with lacquers suited to whatever coating is applied. Chromium does not need to be protected by lacquer, but when portions of a polished chromium surface are to be colored, an undercoat formed by a special chromium primer must first be baked on, since no air-drying lacquer will adhere satisfactorily to polished chromium. This primer adheres tenaciously and provides an excellent foundation for any kind of lacquer-enamel that may be desired for the finishing coat.

Baldwin-Duckworth Non-Corrosive and Heat Resistant Chains Bulletin No. 59. The machine finished power transmission chains and roller chains made by Baldwin-Duckworth Chain Corporation, Springfield, Mass., are described and illustrated in an eight-page folder which is now being distributed by that firm. The bulletin includes a table showing the resistance of the stainless steel used in these chains to various types of corroding agents. Specifications and prices are included. Copy free upon request.

Wright Low Elevating Platform Truck Catalog No. 4. This 16-page catalog describes and illustrates the features of the Wright industrial truck, manufactured by Wright-Hibbard Industrial Electric Truck Co., Inc., Pleasant St., Phelps, N. Y. Beginning with a discussion of the mechanical features, which is illustrated with pictures of the details of the mechanism. the catalog shows a number of typical uses of the truck, describes the outstanding advantages, and closes with a table of specifications. Copy free upon request.

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If there is a "kink" or short cut in use in your shop, send in a description of it. . . . Each one published will be paid for.

Question: We are submitting samples of flanged steel discs with which we have trouble, due to the fact that they stick together in the barrel and some are only burnished on one side. This necessitates an inspection to separate the parts only partially burnished, so that they can be done over again. How can we overcome this?

Answer: Barrel Finishing is a purely inanimate operation. In mass burnishing of any flat parts there are always certain of them that will "stick together." The reason for this is the same mechanical principle whereby Johannsen Swedish Gauge blocks are held tightly together. In the case of the flanged discs the probability of sticking is not so great as with simple flats. When soap solution with its lather of air bubbles is held between the discs it creates a suction contact that even the stress of the resultant force of the burnishing operation will not completely dislodge. The only positive way in which your difficulty can be overcome is to slip a small cotter pin over each disc, allowing the flange of the disc to rest in the eye of the cotter pin. This would require two additional handlings, one to place the cotter pin and one to remove it. It might be simpler to separate and re-burnish such parts as were not completely finished in the initial operation.

Answered by H. Leroy Beaver.

Dust in Finishing Rooms and Ovens

By John E. Hyler

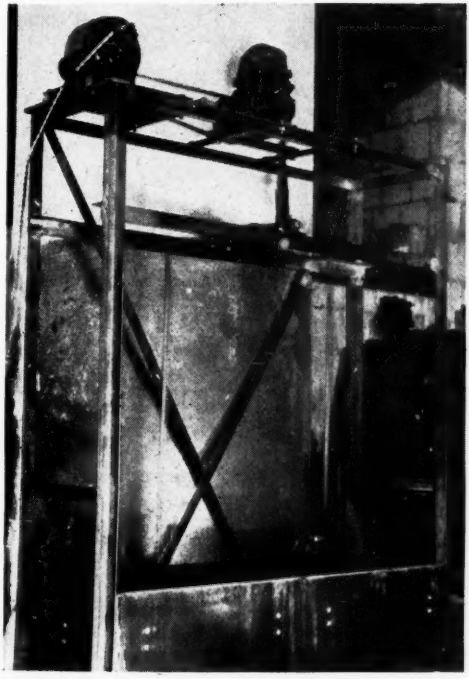
DUST in the finishing room or in the finishing oven is an enemy to a good finish every time, and therefore anything that can be done to eliminate it or even to limit it is distinctly worth while. Drafts should be cut down or eliminated just as much as is possible. Doors leading into the finishing room should be kept closed as much as possible, and when they are opened and closed, they should be opened and closed gently. The same thing is true of oven doors. When an oven door is opened quickly, a rather powerful vacuum is induced in the oven for an instant, which draws dirt from behind heaters or from other inaccessible places, and into contact with the surfaces on which finishes are being baked.

Dirt should be drawn out of all such places periodically with an industrial vacuum cleaner, if one is available, and surfaces that are easily accessible may well be gone over with a damp cloth at intervals when the oven is not being used, if possible.

One of the things which draws dust

Illustration showing workman examining washed bearing.

into a finishing room many times is the action of exhausting fans at spraying booths, the continual exhausting of air from the booth stacks creating a condition of slight vacuum within the finishing room. This causes air to be drawn into the room from all sorts of small openings. The remedy for this condition is to use fans to supply to the room as much or more air than is exhausted, passing it through filters in so doing. If a condition of very slight compression can be obtained, the finishing room will repel dirt and dust rather than attract it.



Anti-friction bearing washing machine installed in the Westinghouse Service Shop, Chicago.

Bearings Cleaned in Washing Machine

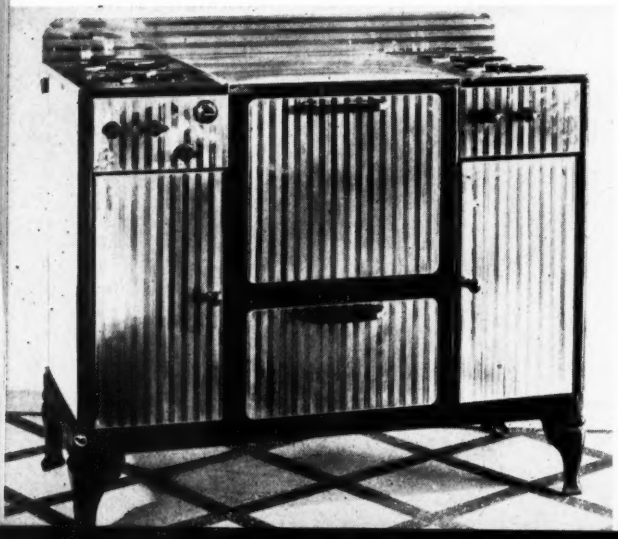
A motor type washing machine in which anti-friction type bearings are thoroughly washed and scrubbed has proved a great aid in servicing motors at the Westinghouse Chicago Service Shop. Two baskets 10 in. by 15 in. in size and 5 in. high are suspended from a rocker arm that dips the baskets into and out of the cleaning fluid at the rate of 44 times per minute. All bearings are washed for at least ½ hour. When a bearing comes out of this machine every particle of hard grease and dirt is said to have been removed. The bearings are then coated with fresh lubricant and wrapped in oil-proof paper for storage until reassembled in the motor.

FINISHES THAT AID IN APPEARANCE AND UTILITY

(Photo Courtesy The Hobart Manufacturing Co.)

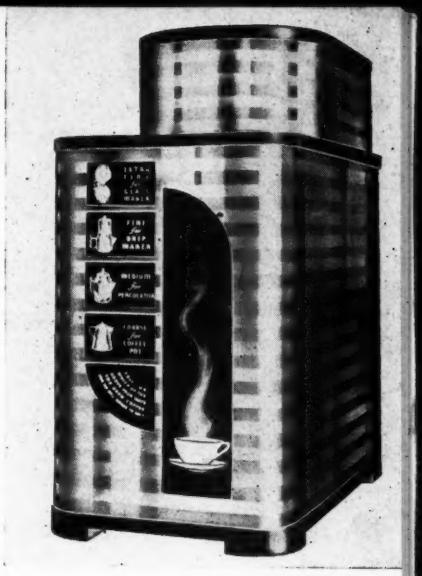
(Right)—The container of the cream whipper shown herewith is of highly polished stainless steel and the base of the unit, containing a motor driven compressor, is chromium plated.

(Photo Courtesy The American Rolling Mill Co.)

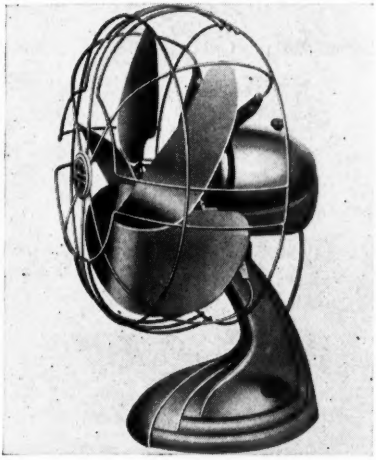


(Left)—The novel striped effect on this range is achieved with polishing and buffing equipment in the manufacturer's plant. The protruding parts are polished to a lustrous finish, while the indentions retain their original dull finish. All trim is in jet black enamel.

(Right)—A silent salesman. Contrast this modern grocery store coffee mill with your memory of the funnel-shaped, crank turned mill. Pre-finished chrome steel with alternate bands of satin and bright striping is used for the exterior of this silent coffee salesman.



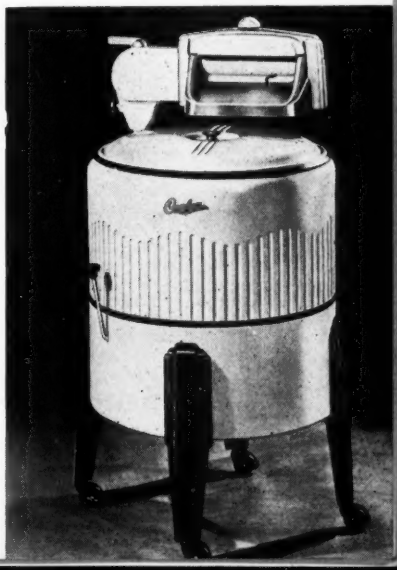
(*Photo Courtesy American Nickeloid Co.*)



(*Photo Courtesy Westinghouse Electric and Manufacturing Co.*)

(Left)—The rich bronze finish of this "streamlined design for super air-flow" fan is very pleasing to the eye and fits well into the color scheme of practically any room.

(*Photo Courtesy The Conlon Corporation*)



(Right)—Enamel is the primary finish on this tangle-proof agitated washer. The understructure, top of cover, wringer housing and the tub are finished in white and the legs in black. The wringer control handle and indexing knob are chromium plated.

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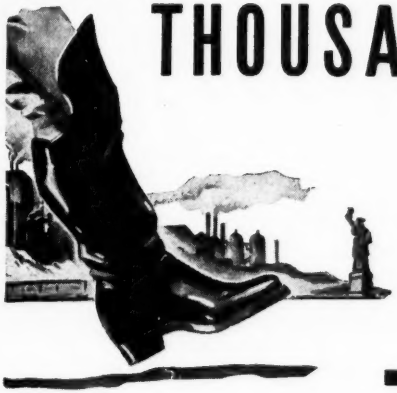

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NEWS of the INDUSTRY

Porcelain Enamel Institute Annual Meeting and Forum

There have been many outstanding events and periods in the porcelain enameling industry's history, but none any more so than the week of October 11, which will be divided into two outstanding features—

1. Seventh Annual Meeting of the Porcelain Enamel Institute in Chicago, October 11 and 12.

2. Second Porcelain Enamel Institute Forum at the Ohio State University, Columbus, Ohio, October 13, 14 and 15.

Annual Meeting

With the largest budget and most imposing program since its organization nearly seven years ago, the Institute is now producing unparalleled results. Basing its proposed 1938 program on this performance the Institute's various sections will present their plans for next year's operations during the first day of the annual meeting.

Chairmen of the following divisions will present their reports and outline their proposals for 1938 for consideration of the Institute membership: Production Control Section, Technical Research Section, Market Research Section, Industry, Trade and Consumer Contact Section, Advertising and Sales Promotion Section and the Administrative Section.

On the second day—October 12—general business of the association will be transacted and 1938 officers, executive committee members and members of the board of trustees will be elected. In addition, there will be speakers who will present subjects of general interest to the membership. One of the subjects which should attract widespread interest is that of the use of porcelain enamel in the architectural field. Prof. R. M. King, the Institute's technical director, has been conducting an intensive study of this subject during the last several months.

Institute Forum

Plans for the Second Porcelain Enamel Institute Forum at Ohio State University are rapidly nearing completion, according to F. E. Hodek, Jr., of the General Porcelain Enameling & Mfg. Co., Institute vice-president in charge of this activity for the second time. Mr. Hodek and his committee, at a recent meeting, outlined the program for this second Forum, and are now negotiating with authorities in their respective fields for adequate presentations of the subjects listed below. Members of the Forum committee who were re-appointed are: F. E. Hodek, chairman, General Porcelain Enameling & Mfg. Co., R. M. King, Ohio State University, A. I. Andrews, University of Illinois, and J. E. Hansen, Ferro Enamel Corporation.

The line-up of the second Forum will be substantially the same as the first, according to the proposed program. Registration will start at 10 A. M., October 13. The first general session will convene at 2:30 P. M. the same afternoon. Additional general sessions will be held all day Thursday and Friday morning. The cast iron, sheet iron and hollowware sessions will be held Friday afternoon.

Ferro Enamel Corporation to Exhibit At World's Fair

Ferro Enamel Corporation, Cleveland, Ohio, has just signed a contract for an exhibit at the New York World's Fair in 1939. The Ferro Exhibit will feature porcelain enamel as a building material and will occupy space in a large building being constructed by the Fair Corporation and to be known as the Shelter Focal Center.

On the exterior of this same building there will be a porcelain enameled mural, 70 feet long by 20 feet high, symbolizing the history of housing in this country. This mural is being designed by J. Scott Williams and Ferro Enamel Corporation will collaborate with Mr. Williams in executing the mural in porcelain enamel.

American Engineering Company Appoints Cleveland Representative

The American Engineering Company, Philadelphia, Pa., manufacturers of Taylor Stokers and Lo-Hed Hoists, has announced the appointment of Sabin Engineering Company, Euclid Sixty-First Bldg., Cleveland, Ohio, as representative in that territory for the sale of Lo-Hed Hoists.

Sixteenth Exposition of Chemical Industries

American industry's triumph through chemistry in a chemical age will be reflected by outstanding exhibits of leading manufacturers at the Sixteenth Exposition of Chemical Industries to be held at Grand Central Palace, New York, December 6 to 11, 1937. The fundamental relation of all industries to chemical processes and the advanced state of national recovery are combining to make this year's Exposition the greatest one to date. Indications four months in advance of opening reveal a spirit of enthusiasm and comprehensive effort in exhibit planning on the part of many of the most representative concerns in the United States. A slogan contest, offering a first prize of $250 for the best description of the function and service of the chemical industries, is drawing additional national attention to the event.

The chemical products to be displayed defy description in any space shorter than a book and consequently only a few of the more interesting can be indicated. A large manufacturer of explosives will emphasize research achievements, including a chlorinated rubber base designed to give longer life to paints, a low cost rosin for use in varnishes and insulating compounds, various synthetic resins, a liquid resin resistant to water and alkali, a liquid resin with plasticizing and adhesive characteristics. The raw material basis for some of these products is tree stumps of southern pines, and cotton linters. Both raw materials, before research developed them, were worthless industrially and were of no value to farmers

Caesium and Rubidium Salts, used in the manufacture of radio tubes and cathode ray tubes will be the theme of one interesting display. Other products by the same exhibitor will be of interest to such widely diverse fields as dyestuffs, chemical industries in general, sugar refining, photography, and radio. Broadly indicated throughout the Exposition is the fact that American industry can produce chemical rarities which heretofore were imported or made primarily as laboratory curiosities. Among the specialty chemicals to be exhibited are hydroxylamine sulphate, rubidium chloride, and other salts of rubidium, also amorphous boron.

There will be shown an interesting series of chemicals whose special applications include the removal of colors and odors, sometimes tastes. One of these products is designed to remove objectionable tastes from water, alcoholic beverages, fruit juices, and vegetable oils. Another related commodity is used to absorb food odors in refrigerators.

The variety of chemical materials on display is indicated by one exhibit which will include 25 different gases used in chemical research, refrigeration, and industrial research. Another is devoted to a display of lime products from deep mined stone, showing the results of chemical control in one of the most modern production plants.

Balancing the sections devoted to raw materials and chemical products will be the many displays presenting the machinery and equipment used in all manufacturing phases of the process industries. One classification of equipment relates to the heating, roasting, and calcining of solids; another will be concerned with the handling of liquids and gases, featuring such units as pumps, compressors, blowers, fans, exhausters, pipes, ducts, conduits, valves, fittings, and tanks.

Crushing and grinding machinery, designed to reduce various chemical products to varying degrees of particle size, will include crushers, grinders, sifters, vibratory screens, classifiers, separators, and ball and pebble mills. Sections will include filteration, evaporating, drying, and distillation. Using stainless steel evaporators, delicate, heat-sensitive products can now be evaporated without discoloration or injury to taste. Food, glandular products, and extracts of food products are among the materials so treated.

One of the most interesting machine exhibits, having a relation to municipal and state sanitation problems, will be an operating model, in miniature, of a mechanical thickener developed for removing 70,000 tons of silt per day from eight billion gallons of turbid Arizona river water. The actual installation employs 72 full-sized thickeners constituting the world's biggest river-desilting and water purification plant.

The practical use of Titanium and Zirconium in the chemical fields is relatively new, but one exhibit at the Exposition will be devoted to showing some recent applications. Featured will be the metals themselves, their salts, oxides, and silicates. Interesting applications of the products include opacifying vitreous enamels, manufacture of welding rod fluxes, and processing ceramic bodies and glaze work.

Principal sections of the Chemical

Exposition will include Chemical Products and raw materials; general plant equipment; processing machinery; pumps, piping, hydraulic accessories; materials handling equipment; containers and packaging; laboratory equipment and supplies; instruments of precision; metals and alloys; brewing, distilling and bottling; synthetic plastics.

The Sixteenth Exposition of Chemical Industries will be under the personal direction of Charles F. Roth, who has been similarly responsible for all previous expositions. Mr. Roth is President of the International Exposition Company with permanent headquarters at Grand Central Palace, New York.

Practical Electroplating Course To Be Offered At The Ohio Mechanics Institute

A course in practical electroplating to be conducted under the direction of Mr. Ezra A. Blount is now being offered during the first and second semesters beginning October 1, 1937 at the Ohio Mechanics Institute, Parkway & Walnut Sts., Cincinnati, Ohio. The course will consist of 32 lectures and classroom demonstrations dealing with the practical operation of plating solutions. This course is intended for students of electroplating and electroplaters who wish to improve and extend their knowledge in their field of endeavor. The course is said to be of a very practical nature and can be readily understood by any student who has a rudimentary education.

The phases of electroplating that will be covered include fundamental principles, cleaning methods, electroplating of copper, nickel, chromium, cadmium, tin, zinc, silver, various alloys and rare metals, plating room design, corrosion, reworking rejected material, plating and polishing processes, and health hazards.

The course includes interesting inspection trips to various plating plants and departments located in and around Cincinnati. Further information can be obtained by writing to Mr. Ezra A. Blount, Department of Chemistry, Ohio Mechanics Institute, Parkway and Walnut Sts., Cincinnati, Ohio.

New Cleveland Office for Detroit Rex Products Company

The Detroit Rex Products Co., 13017 Hillview Ave., Detroit, Mich., manufacturers of Detrex degreasing machines, Perm-A-Clor and Triad Solvents, and Triad Alkali Cleaners and Strippers, announces the opening of a branch office to be located at 812 Huron Rd., Cleveland, Ohio. This office has been established as a part of a general expansion program made necessary by an increased demand for the company's products. The addition of this new branch will help to increase the scope of the personal service facilities offered by the company to its many customers in this area.

DeVilbiss Company Announces Schedule of Training School For Second Half of 1937

The DeVilbiss Company, which sponsors a school that is open to industrial painters, master painters, automobile refinishers, and all others interested in learning the technique of spray painting, and the use and care of spray painting equipment, announces the schedule of classes for the second half of 1937.

The training period lasts for one week. Classes will start on the following dates: September 27, October 25, November 15, and December 13. Special rates in Toledo hotels and boarding houses near the plant have been obtained by the company for men attending the school. The classes heretofore have been well attended because of the facilities for study offered by the DeVilbiss laboratories.

It is advisable to enroll in the school as far in advance as possible, since the size of the classes must be limited and since there will be no training periods other than those announced. Complete information may be obtained by writing The DeVilbiss Company, 300 Phillips Ave., Toledo, Ohio.

Pangborn Adds to Dust Control Staff

Mr. M. I. Dorfan, former manager of the Blaw Knox Dust Division, Blaw Knox Company, Pittsburgh, Pa., has been recently appointed to act as general field representative for the Pangborn Corporation, Hagerstown, Md. In addition to being a registered professional engineer in the State of Pennsylvania, Mr. Dorfan is an active member of the A.S.M.E. and the A.S.H.V.E. He has served on several important engineering and dust committees, one of which established the national standards of exhaust system designs—the A.S.A. To facilitate speed of service to the entire dust field, Mr. Dorfan will contact interested prospects with dust problems from the Pangborn offices in the Chamber of Commere Bldg., Pittsburgh, Pa.

Electroplating Courses Offered At Columbia University N. Y. C.

Four courses in electroplating and electrochemical research at Columbia University, New York City, will be offered by Dr. C. B. F. Young during the coming school year. Registration for the classes will be held September 17 to to 25. The first class will meet at 7:00 P. M. Tuesday, September 28.

Chemical Engineering e83 Electroplating (Industrial Chemistry). Meets each Tuesday and Wednesday night in Room 356, Chandler Hall from 7:00 to 10:00 P. M. The course is designed to give the electroplater or industrial worker a foundation in chemistry. One hour of each lecture is used to discuss the modern theories of chemistry. The two remaining hours are utilized by the student in conducting his experiments under the supervision of the instructor. This course should precede Chemical Engineering e84—Practical Electroplating, which begins in the spring session.

Chemical Engineering e84 "Practical Electroplating". This course is designed to give the practical electroplater a study of ways and means of obtaining better deposits by applying the latest scientific methods of electrochemistry to electroplating. One hour of each evening is devoted to a lecture by the instructor and the remaining two hours are devoted to the application of these principles by the student in the laboratory. The cost of each of these courses is a fee of $30.00 plus a small laboratory or breakage deposit.

In order to take care of students who desire further training, Chemical Engineering e85 and e86, "Investigation of Special Problems in Electro-chemistry" has been established. The course is designed to give the practical electroplater or electrochemist a chance to investigate certain problems which are related to his field of work. One-half hour of each evening is devoted to a conference with the instructor and the remaining two and one-half hours are spent in the laboratory where the student applies his knowledge and technique to the solving of problems which arise in such an investigation. The charge for these courses is a fee of $30.00 for each semester plus a deposit of $10.00 for breakage.

Marvin Marsh Appointed Manager Of Armco Office in Kansas City

Marvin Marsh, special Armco sales representative in the Kansas City territory since 1935, has been named manager of the company's newly created district office at 7100 Roberts St., Kansas City, Mo., according to W. W. Sebald, vice-president in charge of commercial activities of The American Rolling Mill Company, Middletown, Ohio.

Otto W. Winter Appointed Factory Manager of Columbus McKinnon Chain Corporation

Otto W. Winter has been appointed factory manager of the Columbus McKinnon Chain Corporation, Tonawanda, N. Y., manufacturers of chain and hoist equipment. Mr. Winter's previous connections include the Kent-Owens Machine Company, Toledo, Ohio, as industrial engineer; Whitman & Barnes, Detroit, Mich., as general manager of the Cutter Division; Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati, Ohio, as sales engineer; and a period in the U.S.S.R. as a consultant to the Soviet Machine Tool & Cutting Trusts. Mr. Winter is a member of the American Society of Mechanical Engineers, American Society for Metals, and a director and member of the American Society of Tool Engineers. At the present time, he is chairman of the newly-formed Toledo Chapter of the latter society and past chairman of the Detroit Chapter.

Otto W. Winter

New Plant Equipment and Materials

Circo Cyclone Cleaner

A cleaner, to be known as "Cyclone Cleaner," which has been developed specifically for stripping paints, cleaning auto motors, and so on has been placed on the market by the Circo Products Co., 3088 West 106th St., Cleveland, Ohio.

The cleaning vapor is produced in a gas fired generator and passes through a nozzle of the cleaning gun at high velocity. In so doing, the vapor syphons the cleaning solution from the cleaning solution tank—heating, vaporizing, and spraying it on the work being cleaned. Finger-tip control at the cleaning gun entirely regulates the flow of the cleaning vapor, as well as the supply of hot water and the supply of cleaning solution, thus making the Cyclone Cleaner entirely automatic. Shutting off the gun automatically turns off the main gas burner, allowing a pilot to burn, thus keeping the generator ready for duty.

The Cyclone Cleaner heats in three minutes from a cold start and thereafter instantly. Replaceable tips are used with the gas burner. No manual adjustment of the tips is necessary.

Circo Cyclone Cleaner

The Cyclone Cleaner is designed to meet the requirements of the usual fire prevention codes, and to meet these requirements, the air supply to the gas burner can be taken from outside of the building through a sealed pipe or the cleaner can be installed at any required height from the floor, thus eliminating the hazard of heavy explosive vapors.

Since the cleaning solution does not pass through coils, any concentration of cleaning compounds or solvents can be used with the Cyclone Cleaner. Four feeder coils are used instead of one. Should one coil become restricted from boiler scale, the Cyclone will continue to operate. The cleaner is as portable as its water supply, 25 ft. of cleaning hose being provided. The usual location of the cleaner is at proper drainage locations.

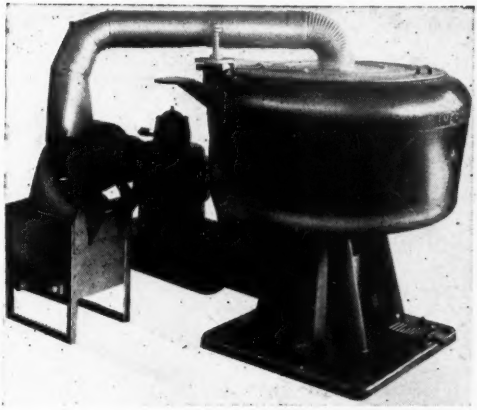
McAleer No. 22 White Chrome Coloring Compound

For mirror lustre, the McAleer Manufacturing Co., 2431 Scotten Ave., Detroit, Mich., has developed and placed on the market a coloring compound to be

known as "No. 22 White Chrome Coloring Compound".

Rochester Metal Dryer

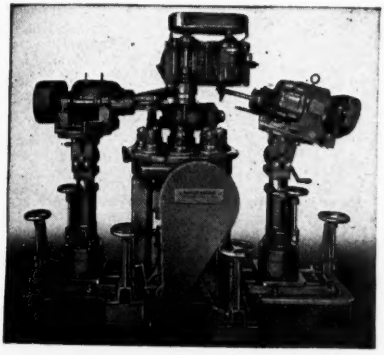
The illustration shows a new type of Rochester Metal Dryer which has been placed on the market by Rochester Engineering & Centrifugal Corporation, 112 Buffalo Rd., Rochester, N. Y. The machine shown is equipped with divisional plates in the perforated Monel metal basket for the purpose of separating different types and sizes of screws, bolts and small metal parts. This design is of advantage where production is desired but where it is necessary to keep separate — in order to maintain the maximum efficiency —the articles making up a single load.



Rochester Metal Dryer

The basket of the machine is removable, thus it may be lifted from the unit and conveyed to the department in which the work pieces are to be used. It is then reloaded and returned to the machine for the next run. By using two baskets, the machine may be kept in practically continuous operation.

The dryer is equipped with a compact steam-heated unit for circulating



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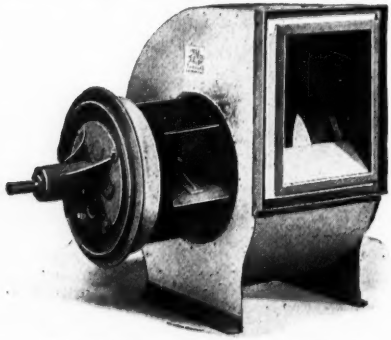
hot air through the load to complete the drying operation after centrifugal force has disposed of the surplus moisture. The use of centrifugal force provides the fastest and most economical means for removing the surplus moisture from the parts being dried. The motor driven unit is powered by a vertically-mounted special extractor motor which transmits the power by means of a silent, positive V-belt.

Thermo High Temperature Exhauster

The Industrial Gas Engineering Co., 201 E. Ohio St., Chicago, Ill., has announced a line of high temperature exhausters designated as No. "PI-10." This type of high temperature exhauster is being manufactured in a wide range of types and sizes for various temperatures. They are available in the patented double housing insulated and air cooled construction, also in a single housing uninsulated construction for application where uninsulated equipment is satisfactory.



Thermo High Temperature Exhauster

All parts subjected to high temperatures are fabricated of various heat resisting alloys best suited to the operating temperatures. Double row, self-aligning ball bearings are used and these are kept cool by a patented air cooling method which prevents the transmission of heat to the shaft and to the bearings. Convenient access to the exhauster wheel is provided, the complete assembly wheel, shaft and bearings being readily removable by the removal of the cap screws which fasten the assembly to the exhauster housing.

The Thermo High Temperature Exhausters are made in three stock classes: class "L" for operating temperatures up to 800 deg. F., class "M" for operating temperatures up to 1000 deg. F., and class "H" for operating temperatures up to 1250 deg. F. Special units can be furnished for temperatures up to 1800 deg. F.

Siefen Sector Buffs for Stainless Steel

The Siefen Sector Buff which is being marketed by the J. J. Siefen Co., 1936 W. Lafayette Blvd., Detroit, Mich., is one buff that is said to be ideally suited to buffing stainless steel. Whether hand work or automatic, this buff will cut

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fast because of its construction. Since it is cut from old buffs, the cloth will not ravel and since it is segmented, it forms pockets that act like saw teeth that really smooth out the metal. For this reason, it can be used effectively on stainless steel, brass, aluminum, and hard nickel. On stainless steel moldings or stampings it has shown remarkable savings.

Taber Abraser

The Taber Instrument Company, North Tonawanda, N. Y., announces the Taber Abraser, a precision testing machine for measuring the wear resistance, toughness, adhesion and rub-off qualities of surface finishes such as enamels, electroplate, anodizing, linoleum, molded plastic sheets, and leather coverings.

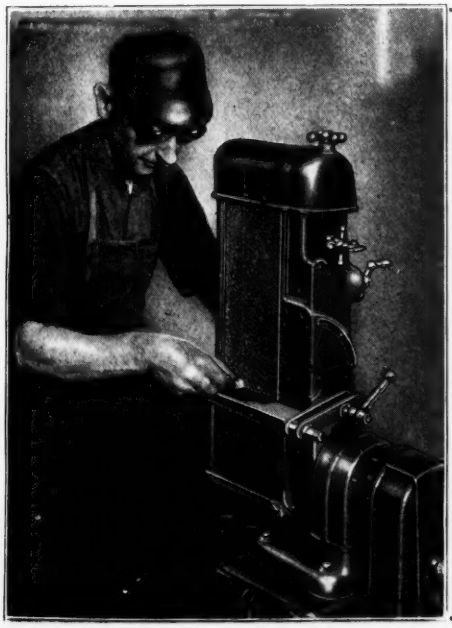
In the research laboratory, the Taber Abraser is said to be indispensable for testing new formulas, control work, checking competitive samples, grading, and so on. Its lightness and portability make it possible for traveling sales technicians to prove their claims and to check competitive materials on location.

According to the manufacturer, concerns making products that require a tough, wear-resisting finish will find

Taber Abraser

that the Taber Abraser renders important service in determining the type of enamel, number of coats, or thickness of finish necessary to meet requirements.

In general, the Taber Abraser is adaptable for testing practically every type of enamel, lacquer, or other non-tacky



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coatings, including electroplated and anodic finishes. Tests to determine the comparative cutting efficiency of abrasive paper and cloth can also be made.

Model M and Model O Chronologs

Two new models of the Chronologs, product of The National Acme Company, 124 East 131st St., Cleveland, Ohio, have been announced by that company. The

(Left) Model M and (Right) Model O Chronologs

Chronolog is an instrument which provides mechanically a printed record of productive and non-productive time on any machine or operation. A record produced by the Chronolog also shows the causes and extent of idle time and a count of the units produced. The Chronolog record may be applied to provide such other production information as may be desired. The two new models now being announced are of simplified construction and operation. While these two models do not provide as much detailed information as the earlier models, they will provide all the data needed in most plants.

The Model M Chronolog may be applied to any machine, process or operation. When the operator begins work he starts the Chronolog, which records the exact minute of the start of the operation on a 4½-in. tape. The window at the upper right shows the clock time. The larger window at the left registers the number of units produced. At any interruption in the work the operator turns the knob at the left to a symbol indicating the reason for the interruption, this movement also registering the symbol on the Chronolog tape. Thus at the end of the day the operator pushes a button on the front of the Chronolog which records the starting time again on the tape.

Every ten minutes the Chronolog prints the count of units produced and the time. Visits of the foreman, inspector, stockman or others to the machine can be recorded on the Chronolog tape. When production is resumed, the printed record shows exactly how many minutes the machine was in operation, the number and extent of all interruptions, and the reason for these interruptions. With this definite knowledge before them, the department and managing executives can easily determine the reasons for interruptions of production and take steps to correct them.

The Chronolog can be used as a time clock at the machine if desired. It may be adjusted so that the digit wheels will give several different combinations. The Model M Chronolog is of simple construction, with nothing to get out of order.

The Model O Chronolog is a very simple device which can be used in a variety of ways. It contains only one set of digit wheels, which may be arranged to count idle time or units produced. It also carries a tape roll which automatically prints every ten minutes, although a printing may be obtained at any time by inserting the card and pushing the button on the front of the machine.

First-Aid Kit for Treating Burns

A first-aid kit, specifically designed for the emergency treatment of burns has been developed by the Davis Emergency Equipment Company, 55 Van Dam Street, New York, for the use of fire departments, in power plants, steel mills, foundries, chemical plants, oil refineries, and other places where burns of a serious nature may occur.

The Davis Burn Kit is furnished in bright red enamel and is conspicuously labelled "First Aid for Burns." It contains 12 gauze compresses, which can be opened up in progressively larger sizes so that they can be used for covering small or large areas; 12 six-yard lengths

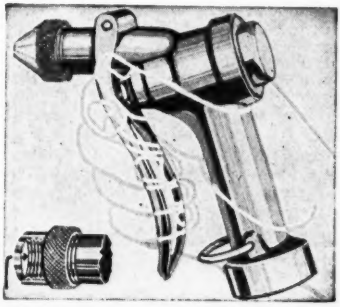
of 4-inch bandage for holding the dressings in place; 6 five-oz. tubes of Tannoid, the tannic acid treatment for burns; and three packages of wooden applicators for applying the Tannoid. All items are packed in unit cartons and the supply as a whole is sufficient for burns involving the entire body.

Tannoid is a jelly containing 5 per cent of tannic acid, which is today recognized and accepted as a most effective treatment for burns. Hospitals ordinarily use a 5 per cent solution of tannic acid which has been freshly made, but as such solutions are impracticable for first-aid work, Davis developed Tannoid, which keeps indefinitely and is always ready for instant use. When Tannoid is applied to a burn, the tannic acid content relieves pain and causes a local coagulation of the burned tissues, thereby preventing the developing of toxins in these tissues.

The mechanical coating formed by the water soluble base of Tannoid also excludes the air from first and second degree burns and so relieves pain. Being water soluble, it can be removed painlessly. A feature of Tannoid is its low freezing point—even at minus 22 deg. F. a burn may be dressed.

No. 200—Tri-Con Air Gun

A trigger controlled air gun, known as the "No. 200—Tri-Con Air Gun," has been placed on the market by Molded Specialties Company, 4712 Chester Ave., Cleveland, Ohio. The body and trigger



No. 200—Tri-Con Air Gun

handle of the Tri-Con are designed to fit the operator's hand. The patented principle in flow control mechanism of the trigger handle enables the operator

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to regulate the volume of air desired, easily and smoothly. It is said to be as natural to hold, aim, and operate as a pistol.

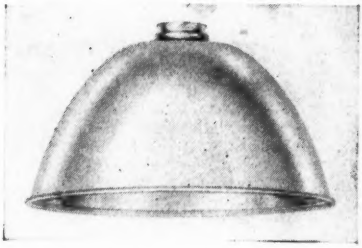
The Tri-Con is made from solid brass, thus rust and corrosion is reduced to a minimum. It is designed so that water pressure helps keep the valve closed, thus insuring ease of operation without strain on hand or fingers. The valve spring is made from spring steel and carefully cadmium plated and an easy-to-adjust packing gland nut is made from solid brass. The valve is designed to prevent pressure on packing box.

A filter screen is provided at the inlet, thus preventing foreign matter from obstructing valve action.

Miller Alzak Aluminum Reflectors

The Miller Company, Meriden, Conn., has placed on the market a new line of high efficiency "Alzak" Aluminum Reflectors for lighting low bay industrial areas under the trade name of "Ivanhoe". The Ivanhoe reflector is said to differ radically in contour from reflectors in general use as a result of being carefully engineered to take full advantage of the high reflection characteristics of Alzak aluminum. A maximum of white light which is said to produce sharp detail is but one of the outstanding qualities of this type of reflector. An accurate control of the reflected light with an angle of cut-off that is strictly in accord with latest improved standards, and uniformity of illumination from wide spacing of outlets are a few of the characteristics of this type of reflector.

The Ivanhoe line is made of heavy



Miller Alzak Aluminum Reflectors

gauge aluminum to insure adequate mechanical strength. The reflectors are light in weight and are said to be ruggedly durable in use. The Alzak processing of the aluminum reflectors is applied in the recently installed Alzak department of The Miller Company. This processing is said to provide a protective oxide coated, sealed-in, surface over the entire reflector that is of silky smoothness and extreme hardness, giving the aluminum a non-porous, permanent surface that does not peel, crack, or discolor under ordinary industrial conditions. By cleaning with soap and water or a non-abrasive cleaner, the surfaces can be quickly restored to their initial high reflection efficiency.

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The Ivanhoe reflectors are available in a complete line of sizes with standard type holders.

"Zetyl" Insulation for Plating Racks

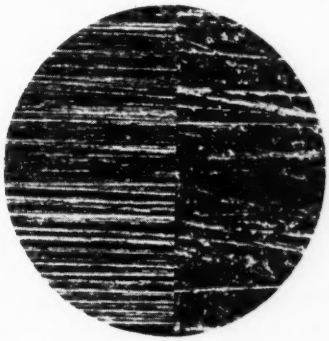
A synthetic gum in liquid form for insulating plating racks, to be known as "Zetyl," has been developed by Nelson J. Quinn Company, 421 13th St., Toledo, Ohio.

Zetyl can be used cold, just as it comes from the container and can be applied with a brush, spray gun, or by dipping. It is recommended for insulating plating racks in plating solutions of nickel, copper, silver, zinc, and cadmium, and is particularly effective for use in chromium plating solutions. It is said to withstand the action of hot or cold acids or alkalies with the single exception of hot concentrated nitric acid. Zetyl can be applied directly to the rack or the rack can be wrapped with thin cotton tape and the material applied over the tape. The coating will stand operating temperatures up to 220 deg. F.

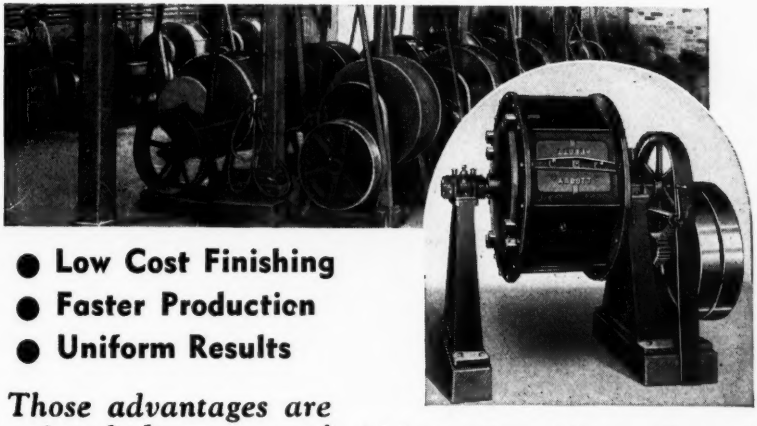
Zetyl can be used as a protective coating on practically any type of finish. It has been used with a marked degree of success on laboratory tables and equipment, exhaust fans handling acid or alkali fumes, pickling baskets, and so on.

Busch Comparison Microscope

A microscope, to be known as "Busch Comparison Microscope," which has been



Visible through the eye-piece, the standard specimen and the piece of work appear side by side.



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developed for the control of surface finishes is now being marketed by the George Scherr Co., 128 Lafayette St., New York, N. Y. The Busch instrument can be used for the examination of highly finished metal work after grinding, polishing, lapping, and so on.

The instrument is so designed that it will permit the comparison of two surfaces, whereby the images of both parts are observed in one common eye piece directly alongside of each other without any separation line, assuring an easy, absolutely reliable and positive comparison. It is also said to permit the examination of one surface in full field of view of the instrument. In this case, the instrument serves as a rugged shop or laboratory microscope, with the advantage of an extra large field of view and built-in illumination.

Perfect uniform illumination is obtained by the use of two frosted bulbs in such a way that when examining cylindrical or curved surfaces, they appear in the eye piece as a flat field.

The Busch Comparison Microscope is mounted on a sturdily built, cast iron stand with movable object stage and is said to withstand the inevitable hard usage of shop or laboratory. It is so arranged that the upper part of the instrument is removable, in which position it can be placed directly onto the work, if necessary, without removing same from the machine.

Since illumination is by means of 110 volt or 220 volt bulbs, connection can be made directly to the main line, without use of rheostat or transformer.

Busch Comparison Microscope

Check in DeWITT OPERATED HOTELS
Genuinely Friendly
In CLEVELAND it's
√ The HOLLENDEN
In COLUMBUS it's
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In AKRON it's
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In TOLEDO it's
√ The NEW SECOR
For Your Winter Vacation:
In MIAMI BEACH it's
√ The FLEETWOOD

Hastelloy B

An alloy to be known as "Hastelloy B" has been brought out by the Union Carbide & Carbon Corp. in collaboration with Haynes Stellite Co., Kokomo, Indiana, and Union Carbide & Carbon Research Laboratories, Inc.

Hastelloy B has been produced primarily for service in equipment handling hydrochloric acid in all concentrations and at temperatures up to and including the boiling point. It is said to stand up well in sulphuric and phosphoric acids, acetic and other organic acids, and in non-oxidizing acid chloride solutions. In 20 per cent hydrochloric acid at the boiling point, the rate of penetration of the solution is only 0.0016 in. per month.

The new alloy is composed of nickel, molybdenum and iron. In this respect, it is similar to Hastelloy A, except that

the proportion of iron has been decreased and the molybdenum content increased. The increase in molybdenum content results in a higher ultimate tensile strength and higher yield point, with practically no loss in ductility or in reduction of area. The physical properties of Hastelloy B are comparable to those of a good grade of alloy steel—the tensile strength in the forged, rolled and fully annealed state being about 135,000 to 140,000 lb. per sq. in. with an elongation of 44 per cent in 2 in. The hardness and strength of Hastelloy B, although making it somewhat difficult to forge, are of good advantage in other ways, for the alloy is unusually strong at high temperatures, as well as at room temperature.

Since Hastelloy B can be forged and rolled, it is available in a number of different forms. Among these, the most important are castings, wrought parts, rolled plate and sheet, wire and welded tubing. Some of the more important applications for Hastelloy B are agitator units, heating and cooling coils, pump and pump parts, condensers, pickling tanks, valves, pipe and fittings. It is expected that because of its excellent physical and mechanical properties, together with its high resistance to hydrochloric and other mineral acids, Hastelloy B will find widespread use for equipment in the chemical and process industries.

Ward Leonard Voltage Regulators

Ward Leonard Electric Co., Mount Vernon, N. Y., has developed and marketed two automatic electronic alternator Voltage Regulators that perform the same functions as do other and older types of quick response regulators. There are no moving parts in these Regulators. Instead of relying upon mechanical means to close contacts or change pressures an inertialess stream of electrons controls the regulating action.

The Regulators are controlled rectifiers deriving their power from the A.C. generator and delivering the rectified D.C. current to the shunt field of the exciter in an amount which is a function of the A.C. generator potential. The corrective action of Bulletin 5601 Regulators starts within one-half cycle (1/120 second) of the slightest change in generator voltage; and Bulletin 5602 Regulators start within one cycle (1/60 second).

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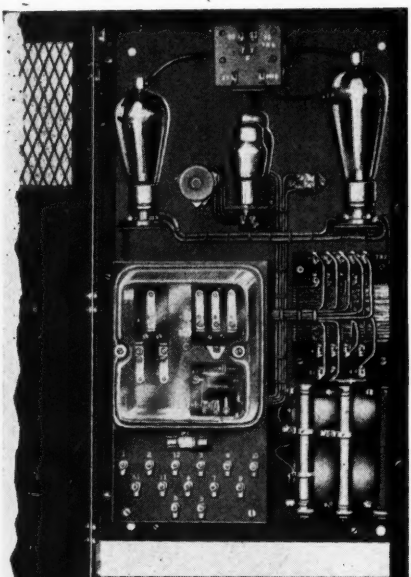

View of Interior of Ward-Leonard Bulletin 5601 Voltage Regulator

The Bulletin 5601 Regulator is designed so that it can be used with any known method of excitation. This Regulator is now designated with an isolated supply transformer making the larger capacities more easily arranged for switchboard mounting. The Bulletin 5602 Regulator is designed for use with one exciter only. It has a wide range of application. first in small plants which have only one generating unit and second in providing individual regulators for plants operating two or more generating units in parallel. It is less expensive than the Bulletin 5601.

Variations of these Regulators can be obtained to maintain constant voltage on 180 cycle generators, such as may be used to provide power for high speed portable tools. These Electronic Regulators, obtainable at a comparatively low initial cost, are easy to install, require no maintenance, or replacement, except the tubes, which have long life.

Solvenite

An industrial cleaning material known as "Solvenite" is now being marketed by Leedan Products Co., 118 Liberty St., New York, N. Y. This cleaning material is granulated and is said to efficiently remove hardened grease, oils, and wax from steel, iron, and machinery parts. It is said to clean by emulsifying, in other words, by destroying the adhesive power of oil, grease, and dirt.

Solvenite is said to have good wetting out and colloidal properties which penetrate the dirt binder and break it into tiny particles which are easily rinsed away. If the solution is allowed to dry on the metal surface it forms a protective film which is said to prevent steel and iron from rusting. Solvenite may be used at boiling temperatures with mechanical cleaning equipment when heavy-duty scrubbing is desired.

Photoelectrically Balanced Potentiometer

The C. J. Tagliabue Mfg. Co., Park & Nostrand Aves., Brooklyn, N. Y., has just announced a new recorder called the "Celectray." In this type of recorder, a sensitive mirror galvanometer is the primary controlling element in which an inertialess beam of light takes the place of the customary metal boom

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Milburn paint spray guns deliver a wide wet spray which speeds the job and produces a better finish.
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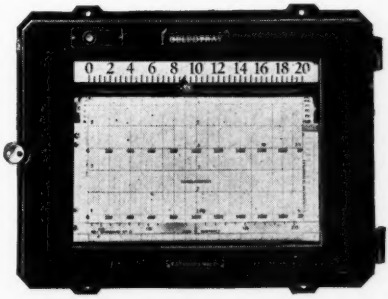
CLEAVELAND
LABORATORIES & MFG. CO., INC.
447 Wilson Ave., Newark, N. J.

or pointer. The beam of light from the galvanometer, in moving on and off a phototube, passes the "controlling edge" of a screen, thus operating relays which in turn control a reversing motor which drives the moving contact of the Wheatstone bridge or potentiometer. The phototube is not a calibrated element but serves only to detect the direction of the light-beam and bring the galvanometer to zero deflection, according to the well-known null method of balancing an electric circuit. The new instrument, therefore, is not a "photoelectric potentiometer" in the sense that a balance of photoelectric current is implied.

It is evident that the galvanometer is free at all times from mechanical engagement, and this fact, together with its low moment of inertia, permits rapid balancing and control actions. Furthermore, a high current sensitivity is available, permitting the use of high resistance, or of very long thermocouple leads without material loss of accuracy in the balancing. Or, on occasion, a very low scale range does not require the use of a very low resistance and its resultant disadvantages.

It is claimed that the new instrument is noteworthy for its extreme simplicity, accuracy and speed, particularly in the multiple point recorders. The average speed of the multiple point instrument is less than 15 seconds per point and the

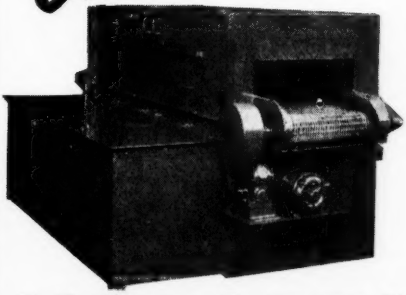


Photoelectrically Balanced Potentiometer

accuracy is guaranteed to 0.1 per cent.

In the Celectray the problem of stopping a moving light-beam on the edge of a photoelectric cell with speed and precision has been solved for the first time. This solution has resulted in the elimination of many parts from the pre-

Your Customers



There is added value in a clean *finished* product, that makes for better satisfied customers.

Hobart Engineers' 35 years of experience in solving cleaning problems is at your service — either to adjust a standard "Hobart" to your particular need, or to install special Hobart equipment.

Special, Traveling conveyor type, side settling tank.

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TROY, OHIO

HOBART Washing Machines for every industrial Cleaning need

vious models and has increased the available speed of recording. Numerous kinds of recorder-controllers, recorders and indicating controllers or resistance thermometers, as well as thermocouples and other electrical devices, are available.

Clark Scrap Truck

A recent addition to the line of material handling equipment made by All Steel Welded Truck Corporation, 1123 Railroad Ave., Rockford, Ill., is the scrap

Clark Scrap Truck

truck illustrated herewith. The truck is 46 in. long at the top, 27½ in. long at the bottom, and 18½ in. deep. It is made from 10 gauge sheet metal constructed on a frame of steel angles and having a handle of 1-in. pipe. The truck is electrically welded throughout and designed for correct balance. Thus it is practically indestructible, leakproof, and easy to handle.

Standard equipment includes two 9-in. diameter semi-steel wheels with Hyatt type roller bearings, Zerk fittings, and one double-row ball bearing caster with 6-in. semi-steel wheel and Hyatt type roller bearing and Zerk fitting. As optional equipment, however, the truck may be equipped with a leg and lock pin assembly for the Clark Lift Jack in place of the caster wheels.

Somay Utility Paint

An exterior utility paint which is said to be self-priming on galvanized iron has been brought out by Somay Products, Inc., Miami, Florida. This paint is said to permanently adhere to old or new matte or spangled galvanized iron without pretreatment of any kind. It is also said to give complete coverage over clay-type emulsified asphalt, hard-drying asphaltums, tile, slate, cement-asbestos and composition roofings, in one coat without any bleed-ups.

On masonry, this paint is said to be an excellent weather-resisting primer or finishing coat. It forms an ideal intermediate film between masonry and oil paint. On concrete or tile floors it is an effective primer for the subsequent application of floor varnish, enamel, or oil paint. It can be applied directly to bare wood by adding linseed oil. On new construction, the wood should receive the usual penetrating coat of white lead and linseed oil before applying Somay Utility Paint.

Belke Rubberite

A liquid rubber-base coating material that can be flowed over inside surfaces of a tank to protect it against attack from acids and to seal seams, to be known as "Rubberite," has been brought out by the Belke Manufacturing Co., 947 N. Cicero Ave., Chicago, Illinois. The material is supplied in 25 lb. cans. For application, Rubberite can be heated in

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the container to approximately 300 deg. F. and then poured into the tank. The tank should be placed in such a position so that the sides, ends, and bottom, one at a time lie in a horizontal position. Approximately 2 lbs. of material are required per square foot of surface covered.

The material is composed of approximately 30 per cent rubber and 70 per cent other ingredients. It cools to provide a rubber-like surface that will not crack, scale or run. It is said to be unaffected by most acids and caustics. It can be applied on steel or wood tanks.

U. S. Dust and Blower Hose

To help combat the dreaded industrial lung disease known as Silicosis, the United States Rubber Products, Inc., 1790 Broadway, New York, N. Y., has placed on the market a dust hose, to be known as "Official P-5508," for abrasives and a blower hose for fumes, to be known as "Official P-5509."

The dust hose is designed for either suction or light pressure, such as that generated by a blower. It is said to successfully withstand the abrasive action set up in the conveyance of various abrasive types of particles. The carcass of the hose is supported by a steel wire helix and is as light as is consistent with long-wearing qualities. It is finished with outside corrugations to lend flexibility and is available in three thicknesses of pure gum tube. The thickness is dependent upon the abrasive nature of the material being conveyed. Official P-5508 Dust Conveying Hose is available in sizes of 2, 3, 4, 5, 6, 8, 10, and 12 inches.

Official P-5509 Blower Hose is similar to the Dust Conveying Hose with respect to carcass construction and wire reinforcement. Since it is offered for blowing service where mainly fumes or gases are conducted and is not designed for conducting abrasives, lighter construction and a compounded tube are used. Sizes range from 2 to 12 inches.

Glyco Foamex

The Glyco Products Co., Inc., 148 Lafayette St., New York, N. Y., has placed on the market a foam inhibitor which is said to successfully inhibit foaming without interfering with the other properties of the product, to be known as "Foamex." The addition of as little as 1½ ozs. of Foamex to 12 gals. of solution is generally sufficient.

Foamex is said to assist not only in dissipating foam in mixing tanks but also for eliminating specks, pinholes, and so on, in finished goods. Foamex can either be added to the water before making the solution or can be added to the finished solution.

Atlas Reducing Valve

The Atlas Valve Company, 282 South Street, Newark, N. J., announces their improved Type "E" Forged Steel Body High-Pressure Reducing Valve for oil as well as water and air. A number of important improvements have been effected to make the valve truly modern in every respect. The internal metal parts are entirely of stainless steel. A formed packing of special material superior to leather has been adopted which is immune not only to water but to oil and other fluids commonly used in hydraulic machinery.

The pressure on the seat is balanced by a piston with the result that variations in high initial pressure have little effect on the reduced pressure. It is recommended that where the reduction is from a high to an extremely low pressure it be performed in two stages using a lower pressure valve for the second stage.

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Genuinely Friendly
In CLEVELAND it's
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In COLUMBUS it's
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Products Finishing

CLEANING

PLATING

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SEPTEMBER • • 1937

Section of Radiator Buffing Department. Note piping system with individual K & B fittings in one main suction line serving two lines of machines.

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To improve general working conditions throughout their large plant, one of the country' foremost auto parts manufacturers installed four K & B Systems: one to remove scale and dust from tumblers and disc grinders; another to remove cast iron dust from rotary milling machines; the third, for removing dust and abrasive in polishing department; the fourth, to carry off cyanide fumes from furnaces in heat treating department. . . In referring to the selection of K & B Systems exclusively, this statement from the company's resident engineer is significant: "Our experience with the tumbler system, together with our observation of Kirk & Blum Systems in other plants, proved to us the ability of Kirk and Blum to design and install systems which would do our work efficiently and economically."

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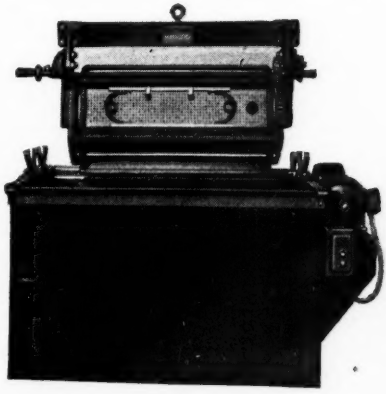

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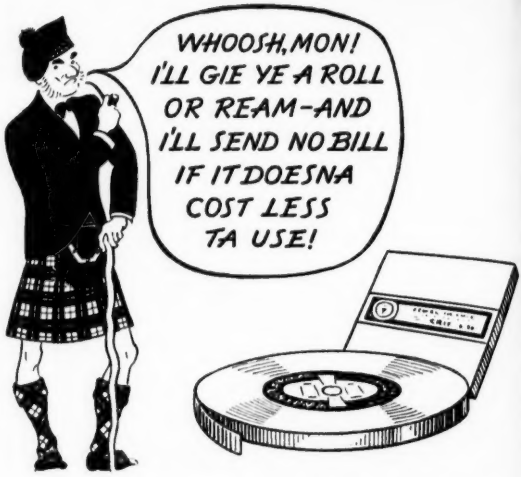

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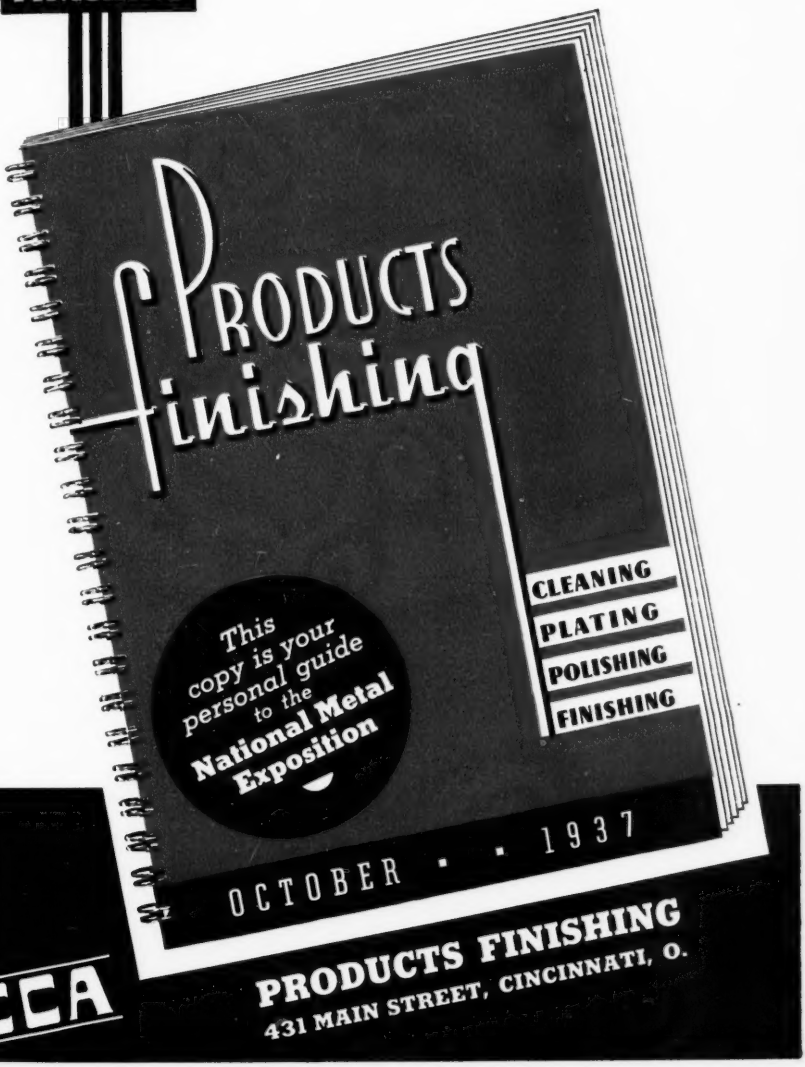

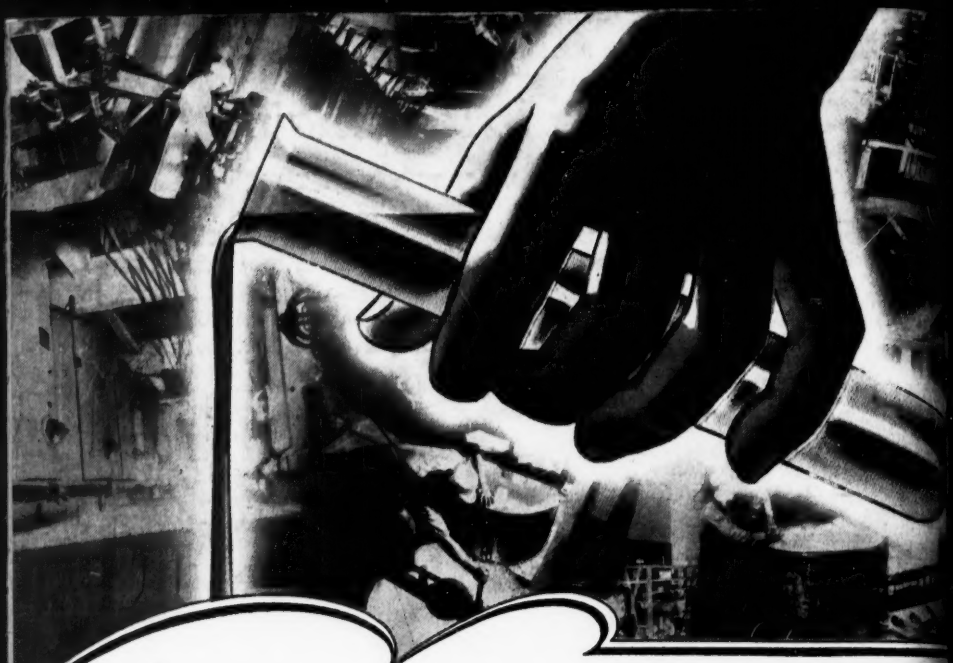

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